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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Annual Meeting Prospects

REPORTS from every side as to the prospects for the Annual Meeting of the Society of Chemical Industry in Glasgow, beginning on July 4, point to an interesting and successful conference. Owing to various conditions over which the Society had no control, last year's annual meeting in Canada was but thinly attended by members from this country, though those who went had no reason to regret their adventure. The fact, however, that the bulk of the members missed the annual meeting of 1921 will probably give a quickened interest to that of 1922. Glasgow, moreover, is an excellent site. It is a great engineering centre, with large chemical interests, and those who know anything of Scottish hospitality will need no assurance that the Glasgow Section will do all that is possible for the comfort and entertainment of the members.

In the programme social enjoyments and serious work have been very happily balanced, and no member should be able to complain of being overworked except those who regard all forms of occupation outside laboratories and works as tiresome and exhausting. The Glasgow meetings should have a humanising effect on this small and much too strenuous minority. The annual general meeting, with the President's address, will occupy the morning of Tuesday, the opening day, and the afternoon and evening will be given up to a luncheon, garden party, and municipal reception. Wednesday morning is allocated to the Messel Memorial Lecture, to be delivered by Professor H. E. Armstrong; in the afternoon there will be visits to the Provan Chemical Works and the Dalmarnock Power Station; the annual dinner will follow in the evening. Thursday morning is free for a visit to a cinematograph exhibition or an inspection of the Harbour, but in the afternoon and evening the Chemical Engineering Group will be in session, and these may be regarded as the real conferences of the week. The general subject chosen is "Evaporation and Distillation." At the first session Mr. P. Parrish will contribute some "Observations on the Design of Ammoniacal Liquor Stills," and Mr. W. A. Walmsley a paper on "Tar Distillation." For the second session papers have been promised by Professor Hinchley on "The General Problem of Evaporation," and Mr. T. H. Gray on "Glycerine Distillation." Friday and Saturday will be pleasantly occupied with an excursion to Loch Lomond, a conversazione at the Royal Technical College, and a visit to the works of the Nobel Explosives Co. at Ardeer. The Society not having appointed an official chaplain, the members will be free on Sunday to select their own forms of devotion. On Monday those members who are able to remain over the week-end will visit the Trossachs, and the official programme will conclude on Tuesday with a trip to Edinburgh, where the University's new chemical laboratories will be inspected.

This brief sketch of the programme is sufficient to justify hopes of a very large attendance, and to explain the difficulty experienced even at this stage in securing hotel accommodation. There being no financial anxieties to worry about and no controversial matters to divide the meeting, the proceedings promise to be of an entirely harmonious character. It is a pity that Dr. Ruttan has not been able to make the acquaintance of the Sections which would have been glad to welcome him, but his appearance almost at the last moment will give his presence and address a certain added interest. Dr. E. F. Armstrong, the president nominated for next year, will bring to the office a set of very strong qualifications, and a personal touch is added by the fact that the annual meeting which elects him to the chair will on the following day welcome his father, Professor H. E. Armstrong, as the first Messel Memorial Lecturer. Altogether the annual meeting of 1922 promises to be a very happy and successful affair

Intensive Acid Systems

THE letter from Dr. H. J. Bush which appeared in our issue of last week was of an importance sufficient to call for further comment. As the capacity of existing sulphuric acid plant in this country is well above present demands, and as it is likely to suffice for some few years to come, it is improbable that the question of the erection of new plant will arise in the near future. For all that, it is of the utmost importance that manufacturers should be kept in close touch with the practical merits and demerits of those intensive systems which have threatened to supersede the well-established and much-favoured chamber process. It is not necessary to follow in detail the attempts which have been made to dispense entirely with leaden chambers, the principle differing in the main in that in the tower methods the sulphuric acid is produced with oxidation taking place in liquids flushed down the tower and not in the gaseous state. Obviously in the tower systems a continuous and energetic circulation of acid containing dissolved oxides of nitrogen is necessary, so that a good deal of mechanical energy and plant is introduced.

Dr. Bush speaks specifically of the Opl tower system which originated in Austria more than ten years ago, and which attracted a good deal of interest over here in the few years prior to the war. We believe we are right in saying that the system was fairly successful, and that over twenty distinct units were erected in Great Britain. In particular, it would be interesting to have a first hand opinion from those who have operated the plant as to whether or not they find on balance that its selection in preference to the chamber plant has been justified. In turning to a description of the Opl process given by a well-known technical writer in 1916 we find the following account of its advantages: "A tremendous reduction is effected in both the ground space and actual volume; there is a considerable reduction in the original cost, and consequently in repairs, depreciation and interest; the acid is of uniform strength of over 140° Tw.; the possibility is provided of employing burner gases of a widely varying content of sulphur dioxide; there follows a low consumption of nitre, a uniformly low acid-content of the effluent gases, and easy supervision of both the plant and its working." On paper this looks attractive, more particularly as the same writer mentions but two points when viewing the process from the opposite standpoint. The chief disadvantages, he says, are the cost of circulating the large volumes of acid (which, now that mechanically efficient acid-resisting pumps are available, is quite small), and the resistance offered to gas flow by the tower packing.

Dr. Bush, however, now tells us that the Opl system has not succeeded in gaining favour to any great extent among sulphuric acid makers, either here or abroad. In contrast with the writer quoted above he says that he knows of no case where the cost of operation has been less than that of a chamber plant, while other drawbacks are the large quantity of cooling water demanded and the failure of the system to provide storage facilities. This is a valuable first-hand opinion which our readers will be grateful to Dr. Bush for furnishing, for of all regrettable practical experiences there is, perhaps, none so galling as that of having risked the selection of a new and promising but untried process in preference to an older but proved method. There is still a good deal to be said about some of the newer systems for the production of sulphuric acid, and one would like to have more detailed practical information concerning, say, the processes which go under the names of Griesheim, Petersen, Moritz, and Duron. We shall welcome any further correspondence on this subject; and, meanwhile, we shall hope to return more fully to it in our special "Heavy Acids" number, which will appear at the end of the present month.

The Dyestuffs Position

SINCE our last issue communications have reached us in reference to the general position of the British dyestuffs industry, as affected by recent developments in the British Dyestuffs Corporation. We deeply appreciate the frankness with which the situation is discussed, and our best return for the confidence reposed in our discretion would be to strive to make the most helpful use of the information placed at our service. First, let it be said as plainly as possible that merely personal interests have no place in our mind, any more, we are sure, than they have in the minds of the parties more immediately concerned. What is at stake is a national interest to be decided solely by considerations of national policy. The position, shorn of its detail and *personnel*, may be summarised quite shortly. The establishment on sound scientific and commercial grounds of a British dyestuffs industry is the paramount concern. The opinions of those who are not interested in this object and who would view with equanimity a return to our former dependence on Germany or other foreign sources need not be considered. In the establishment of a British industry the success or failure of the Dyestuffs Corporation is a chief factor. Its success would put any thought of reversion to our former state of dependence out of the question, and concurrently with its success other British concerns of a smaller but extremely valuable class would proportionately benefit from British users learning to look for their supplies to British producers. What would the failure of the Corporation mean? It would mean a lasting slur on British reputation for initiative and capacity. It would mean, once the chief competitor was out of the way, a resort to "deals" with the I.G., to the gradual restoration of Germany's control of our dyestuff supplies, and to the collapse of many of the new concerns which are steadily getting on their feet. In a word, with the Corporation dyestuffs manufacture as a national industry stands or falls.

If this is an accurate analysis of the situation, the duty of all who do not wish to see British enterprise discredited is clear. It is, first of all, to help, or at least not to hinder, the present efforts at reconstruction. Next comes the need of a sound policy loyally and unitedly supported by all concerned. On the details of such a policy we are not qualified to speak; they must be decided by those in command. But unity is essential. Even a second-rate policy, backed by loyal and united work, is better than a theoretically perfect policy hampered by division and internal friction. Whoever is in supreme charge must have the undivided

support of the crew. Last of all, the departmental work—whether scientific, technological or commercial —must not only be the best of its class; it must be correlated and unified into one complete whole. However good in sections, it cannot successfully be run in independent watertight compartments; all must work as parts of one machine for one central purpose. We believe that if these first principles are agreed upon they would simplify the situation. Their adoption ought not to be impossible among men all sincerely anxious to achieve success, and anxious, too, that no personal considerations should obstruct the public interest. Public controversy will not help; what will help, and what we hope these words may facilitate, is a sincere search for the best practicable policy, and a hearty collective effort to bring that policy to success.

Progress in Fine Chemicals

At a time when political, merchanting, and other interests make very difficult any fair review of the position of the British Fine Chemical Industry, it is helpful to have such an informed and dispassionate estimate as that which appears in the current issue of *Nature* over the initials "M. O. F." The writer, easily to be identified by these letters, points out that during the period of twenty years preceding the war, it was a frequent complaint among organic chemists that there did not exist in this country a firm resembling Kahlbaum or Schuchardt, from which it would be possible to obtain, at short notice, large or small quantities of those organic compounds, both common and obscure, required for the prosecution of research. The British Industry, however, has now grown to respectable dimensions, and it does not seem fair, now that the famine in German products is over, to withdraw support from those manufacturers who have expended money and thought in meeting a national need at a critical period. Comparing current British prices with those of German materials prevailing in this country before the war, "M. O. F." has taken at random fifty typical substances, and found that in fifteen cases the present British quotations are lower. Furthermore, dividing the British (1922) by the German (1913) price, and averaging the factor for the fifty examples, an over-all factor of 1·4 ensues. Remembering that the corresponding factors given by the Ministry of Labour for April, 1922, as compared with July, 1914, are: Food 1·73, rent 1·55, clothing 2·40, fuel and light 2·15, other items 1·95, he regards the foregoing factor, 1·4, as astonishingly moderate, bearing in mind the difficulties which attend the enterprise. Another feature of the price question, he suggests, deserves recognition. While the Safeguarding of Industries Bill was under discussion, it was freely stated that the measure would lead to enhanced prices for the domestic products involved. If, however, the quotations in April, 1922, are compared with those in September, 1921, for the same fifty typical materials it is found that, of the forty-six listed in the earlier catalogue, the price of twenty-four is unchanged, the price of twenty is reduced, whilst in two cases only has it been increased. Surveyed generally, the British quality reaches a high standard.

It is encouraging to hear from so good an authority that the range of fine chemicals now offered is commendable. The organic chemist, particularly in the opening phases of an investigation, sometimes requires relatively obscure compounds in quantities of a few grams at a time, and the convenience of a British price list comprising 2,500 individual substances for use in research or analysis approaches, within a praiseworthy distance, the advantages offered by Kahlbaum and Schuchardt. The conclusion to which "M. O. F." comes is that moderate self-denial and exercise of fair play during the next few years appear to be the principal equipment required to secure chemicals of good quality at reasonable prices.

Points from our News Pages

The concluding portion is published of Mr. Harold E. Potts's article on "The Influence of Patent Law on the Evolution of Research" (p. 762).

A description is given of two new scientific instruments recently exhibited before the Royal Society (p. 766).

Further questions bearing on the dyestuffs position and other matters are reported in our Parliamentary news (p. 767).

Although, our London Market Report states, business has been quiet this week owing to the holidays, values continue firm, and prices of imported products tend to harden (p. 773).

According to our Scottish market report, the past week has brought fair inquiry and prices generally have been steady (page 775).

Books Received

Within the Atom. By J. Mills. London: George Routledge and Sons, Ltd. Pp. 215. 6s.

Dyes Classified by Intermediates. By E. N. Shreve. New York: The Chemical Catalog Co. Pp. 625. $10.

Supplement to Notes on Qualitative Analysis. By H. J. H. Fenton. Cambridge: The University Press, 1922. Pp. 202. 3s. 6d.

Chemical Lime. The Callow Rock Lime Co., Ltd., 810-11, Salisbury House, London. Pp. 32.

The Institute of Brewing Research Scheme. Report II. Pp. 20.

Industrial Nitrogen. By P. H. S. Kemp. London: Sir I. Pitman and Sons, Ltd. Pp. 100. 2s. 6d.

Catalytic Action. By K. George Falk. New York: The Chemical Catalog Co., Inc. Pp. 172.

The Calendar

June 14	Royal Microscopical Society: "The Microscope in Paper Making." J. Strachan. "The Use of the Microscope in the Brewing Industry." A. Chaston Chapman. 7 p.m.	20, Hanover Square, London.
15	The Chemical Society: "Ring-chain Tautomerism. Part III." C. K. Ingold and E. A. Perren. 8 p.m.	Burlington House, Piccadilly, London.
19 to 23	Chemists' Exhibition and Drug Trade Mart.	Central Hall, Westminster, London.
20	Glass Bottles Inquiry resumed.	London.
21	Society of Glass Technology. Ordinary Meeting. 2.30 p.m.	Sheffield.
27	Third International Chemical Conference.	Lyons.
July 2	Société de Chimie Industrielle. Second Annual Congress.	Marseilles.
4	Society of Chemical Industry. Annual Meeting.	Glasgow.

Influence of Patent Law on the Evolution of Research

By Harold E. Potts, M.Sc., C.P.A.

We give below the concluding chapter of an article by Mr. Harold E. Potts, one of our first authorities on Patent Law, on "The Influence of Patent Law on the Evolution of Research." The first instalment appeared last week (June 3).

We have now gone so far as to see that if an invention, even a small one, has been made, we can patent it and stop others from using it. How can we stop them from making imitations and variations?

This is done by generalising the idea as far as possible. If we discover a new resin obtained by condensation of cresol with a reagent *X*, we must extend our claim by generalisation to cover all condensations of *X* with similar bodies, such as phenol. But there are two vital limitations to our generalisation.

(*a*) It must not cover anything old.

(*b*) It must not cover anything unworkable.

Thus if we found phenol had been used before, we might claim the use of *X* plus a dihydric or polyhydric phenol; but if resorcinol was a failure, our claim would then be bad.

Similarly, we should attempt to cover all equivalents of *X*, remembering that we should have to define it to exclude formaldehyde and all the other known reagents for resin-formation.

The Scope of a Patent

Let us take examples to illustrate the necessity for excluding what is old and unworkable, but for including all other possibilities.

(1) In the oxidation of acetaldehyde to acetic acid by oxygen in presence of a catalyst, there is a tendency to form the explosive peracetic acid.

Suppose I discover that some complex aromatic magnesium compound is a catalyst which accelerates the decomposition of peracetic acid, I may desire to protect my discovery broadly, and claim:

"A process for oxidising acetaldehyde to acetic acid by oxygen in presence of a catalyst consisting of a compound containing manganese in combination with an organic radical."

This would give wide protection except for the unfortunate difficulty that it would be invalid because the generality of the language would include manganese acetate, which is known as a catalyst in this reaction. Hence care must be taken to use language which is wide enough to include all practicable variations of the invention but narrow enough to exclude anything already known.

(2) The Normann patent for fat hardening was undoubtedly novel, since it contained the first suggestion to hydrogenate a *liquid* fat in presence of a catalyst. Previous knowledge would have caused a chemist in 1903 to reject the idea of using a catalyst in presence of an oil. The patent was held invalid because it did not contain a disclosure sufficient to enable a skilled chemist to obtain any result with the knowledge available in 1903. But the judge also said that as Normann claimed the hydrogenation of all fats and glycerides, his claim would have been invalid if any single fat of commercial importance gave no result at all. We must add that in cases of this kind, the Courts are lenient if the other members of the class give any result at all, even a small result of little practical value; but this illustrates the necessity of excluding impracticable variations of the invention. Thus if we discover that a methyl body can be used in a certain process, we must be careful in claiming all alkyl bodies unless we are certain that the homologues all give *some* result, or unless we can give some criterion which will distinguish the useful from the useless homologues.

(3) On the other hand, we must be careful to extend the scope of our patent as far as reasonably possible. In the oxidation of acetaldehyde to acetic acid, the discoverer of manganese acetate as a catalyst was careful to extend his claim to the manganese salts of organic acids in general: if we know that inorganic manganese compounds act as catalysts in the liquid phase, and if we discover that manganese acetate gives specially good results, it is reasonably certain that any manganese salt of an organic acid will exert some catalytic activity, without exhaustive verification of all possible salts. Here the generalisation prevents competitors from infringing by the use of the formate or benzoate or other salts which might be used commercially in the small quantities necessary.

We conclude, then, that it is necessary to prepare a form of words of carefully adjusted breadth which excludes everything old and everything useless, but includes possible infringements.

Methods of Procedure

We must now examine the procedure which is necessary if we are to construct such a formula. In the first place, it is clear that we must know the literature thoroughly. Having surveyed the state of prior knowledge we must then determine how near we can go with safety and still retain some of the advantages of our discovery. We must not limit ourselves to optimum conditions. We mention them, but we state that some of the advantages can be obtained if we modify them to a stated extent.

We must, further, be able to prescribe the conditions of success if we vary the process by using other reagents, and, in short, we must have a full comprehension of the theory of the process, otherwise we shall find it impossible to exclude useless variations.

Finally, we must then dissect the process mentally and ask ourselves what is the characteristic and essential feature, and how this can be retained while modifying the other features of the process.

We must regard the reagents we use as members of a class—the difficulty is to determine which class. When tanning agents are made from phenol, formaldehyde and sulphuric acid, we must compare this process with the Bakelite process for producing plastic masses from phenol, formaldehyde and an alkali. We shall find that sulphuric acid is not acting as a condensing agent, but as a sulphonating agent. The phenol, however, is not acting specifically, but as an aromatic hydroxy body, so that we can replace it by cresol. The formaldehyde could be replaced by its polymers.

We must also consider the various *steps* of the process. Can we modify it by performing the reaction in several stages, *e.g.*, by sulphonating the phenol and then condensing this with the formaldehyde?

It would take too long to discuss this case in more detail, but it is sufficient to say that the process must be critically considered, not from the point of view of obtaining the best yield, but from the angle of the intelligent infringer who may be satisfied with using a slightly inferior variation if by so doing he can escape the patent. It will be seen that such an all-round development of the original idea can be made most readily if we are familiar with the theory of the invention, because we can then specify the conditions of success and consequently foresee the possible variations.

The Importance of Theory

It will be realised that I have been leading up to what ought to be the crucial feature of modern patent practice—its insistence on the importance of theory as the surest means of preventing infringement by allowing the writer

of the specification to generalise the invention as widely as possible. Let me now conclude by showing how this should react on industrial research.

In the ordinary way, if an invention is made in an industrial research laboratory, the investigation on a small scale is continued until an apparently satisfactory result is obtained. So far the procedure is scientific. Semi-large scale operation then begins, and a whole host of difficulties immediately arise.

For example, let us consider how the Grillo-Schroeder contact process might have evolved in passing from the laboratory to the works. Suppose that the inventor discovered that magnesium sulphate was an excellent carrier for the platinum catalyst because it was possible to make porous lumps of the material and to regenerate the catalyst by treatment with water. Such a carrier obviously has great advantages over the known pumice or asbestos. Having made this discovery in the laboratory, let us imagine that a provisional specification was filed and that during the period of provisional protection the invention was put into practice on a larger scale. Two sets of problems would immediately arise :—

(1) For the purpose of patent protection, it would be desirable to know what other soluble carriers could be used instead of magnesium sulphate. Is it necessary to use salts containing water of crystallisation or not ? Which salts exert a poisonous influence on the catalyst ? Is it absolutely essential to use a neutral salt or is the efficacy of the carrier destroyed if it is converted into sulphate *in situ* by the action of the reacting gases ? These questions open up a large field for research.

(2) On the other hand, an entirely different set of problems would arise in the works. Having found that magnesium sulphate was satisfactory in the laboratory, it might not be considered necessary to investigate other salts, and attention would certainly be concentrated on the problem of forming the catalyst mass in such a way as to obtain maximum strength and porosity, so that a minimum quantity of platinum would give the best results and the formation of dust would be avoided as far as possible. It would be necessary to make exhaustive experiments on the method of impregnation and on the relative merits of evaporation of solutions of platinum chloride and magnesium sulphate or impregnation of the solid magnesium sulphate with the platinic chloride. A further series of experiments would be necessary to determine the optimum moisture content, and it will be realised that here also a wide field of investigation would be opened.

Now it is perfectly clear that the second set of practical problems must receive foremost attention, but there is a grave danger that in so doing, the attention of the research department may be entirely diverted from the other problems which are equally necessary if the theory of the subject is to receive adequate attention. This divergence between two possible lines of development is frequently possible in the investigation of a new discovery, and it often leads to a total neglect of the underlying theory with the result that if a patent is obtained for the single operation which has been industrially investigated, the field of possible alternatives may be left free to infringers. A striking illustration is to be found in the history of organic accelerators for the vulcanisation of rubber. The first inventor to propose the addition of an aromatic nitrogen compound as an accelerator of vulcanisation may have been preoccupied with determining the best conditions under which practical success could be obtained with the particular substance he had discovered, and he overlooked the wide generalisation that apparently any organic base exerts an accelerating action. A fuller study of the theory of the reaction would, indeed, have disclosed the existence of still other organic accelerators not included in this category.

Importance of Large Scale Investigation

Of course, we must not under-estimate the importance or difficulty of the large scale investigation of a laboratory discovery. When a process is performed on an industrial scale, the conditions are very different in that it becomes necessary to consider all kinds of facts which are not noticed in the laboratory. Thus it is necessary to select resistant material for the vessels containing the reacting substances. It is necessary to consider the method of transporting viscous or semi-solid reagents. The effect of impurities, and especially of accumulation of impurities, presents fresh difficulties. The problem of agitation is undoubtedly different on the large scale. If the reaction is exothermic, temperature control is enormously more difficult with large bodies of material. These and many other problems call for thorough investigation, and it may be noted that frequently further patentable inventions will be made during this investigation. It may well be that a process has been previously proposed on a small scale, but that invention of a high order may be required to make it practicable on the large scale.

Nevertheless the fact remains that when a process is being developed on a technical scale, there is a grave danger that the immediate practical difficulties may so preoccupy the research staff that the broader theoretical principles are apt to be neglected. Now, as we have seen, a thorough grasp of such theoretical principles is most desirable if the results of research are to be protected by patents, and I conclude, therefore, by saying that the investigation necessary to satisfy the requirements of Patent Law is a wholesome corrective for the asymmetry of development which is likely to occur in industrial practice. It may be added, in conclusion, that fresh technical ideas are likely to be discovered as a result of the interaction between the line of thought of the industrialist, who is mainly concerned with increased efficiency of his process, and the line of thought of the specification writer, who is mainly concerned with generalising the inventive idea as widely as possible. Frequently the inventor's procedure is intuitive or instinctive, whereas the procedure of the patent agent is logical and analytic. Co-operation along these different lines, therefore, tends to bring out fresh views and to emphasise the importance of points which may otherwise be overlooked.

I have endeavoured to show that industrial research ought to develop in an exponential ratio because each fresh discovery ought to provide fresh data for further investigation, to which it will act as a stimulus. This can only take place if the results of such research are available to the public and if the claims of theory receive the attention which they deserve. The patent system clearly provides the necessary publicity, and I have attempted to show that if patents are prosecuted with the attention which they deserve, they will also accentuate the importance of theoretical investigation. It seems clear, therefore, that the progress of chemical invention is intimately bound up with the efficiency of the patent system, and that it is the duty of chemists to make themselves familiar with the requirements of the Patent Law, since the efficiency of practitioners of the law is bound to be increased if their clients appreciate the difficulties more fully.

Colour Users' Pocket Book

DESIGNED for the waistcoat pocket, yet containing a mine of useful information, a pocket book which has been issued by the Colour Users' Association, Manchester, to all its members, will be of great assistance to every dye user. In addition to a list of members and the usual diary items, the booklet gives a reprint of the Dyestuffs Act, with the procedure for applications for licences. A valuable feature is the inclusion of extracts from correspondence, etc., relating to dyestuffs. A table is given of United Kingdom imports, of dyes and dyestuffs obtained from coal tar for 1913 to 1920, and a number of useful tables and statistics are also included.

Carbon Black

Its Sources, Production, and Various Uses

THE important substance known as carbon black is a product of the United States chiefly, being derived from the natural gases of which that country possesses such large quantities. From the point of view of the possibility of making carbon black production a home industry, the subject has little interest because the British Isles contain practically no natural gas. It is, however, far different with Canada, which possesses in several parts of the Dominion, and particularly in Alberta, very large resources of natural gas, new and large discoveries of which are of frequent occurrence. Other parts of the Empire, such as India and Queensland, also appear to be rich in natural gas, and therefore there is no reason—even if the British Isles cannot contribute to the supply—why British sources should not be substantial producers of a large proportion of the world's requirements of carbon black.

The production of carbon black from natural gas, which is almost entirely a mixture of various hydrocarbons, is exceedingly simple. It consists of burning this inflammable gas with a limited proportion of air and allowing the smoky flame to impinge upon a cooled surface such as is formed by the bottom of an iron vessel through which a stream of cold water is made to flow. No other substance is known which makes an efficient substitute. It is true that lampblack is employed for certain purposes, as well as carbon black, but for most of the purposes for which carbon black is used lampblack cannot take its place. Carbon black differs from lampblack, which is of a greyish black; carbon black is a fluffy jet black material, very light, absolutely free from grit and miscible with oil. In its brilliance and intensity of colour it is unsurpassed for the manufacture of printing ink, to which purpose approximately 35 per cent. of the total production is applied. The desideratum for modern rotary printing presses is a rapidly drying ink permitting operation at high speed; the ink must be freely flowing, must possess great covering power, and must make an instantaneous and easy impression. The ink from carbon black possesses all these qualities. The usual procedure in making printing ink consists in mixing carbon black with oil in the proportion of 1 lb. of the former to 8 lb. of the latter. Nine lb. of such ink will print 2,250 copies of a large 16-page newspaper; this is equivalent to 90 copies of a 300-page octavo book. A consideration of the multiplicity of metropolitan dailies and their millions of circulation, and of the vast numbers of magazines, will give some idea of the service that carbon black renders to the reading public.

Within recent years carbon black has, however, found another use of no less importance. For a long time manufacturers of rubber tyres for automobiles, especially heavy motor trucks, have been searching for a substance that would increase the life of rubber by improving its wear-resistant power and increasing its resiliency. Such a reinforcing agent was eventually found in carbon black, which actually increases the tensile strength and elasticity of motor tyres 25 per cent. and 10 per cent. respectively. Manufacturers are thus enabled to guarantee to tyres a mileage of from 6,000 to 10,000 miles.

In the automobile industry carbon black finds a further use in providing a pigment for automobile tops and cushion coverings that is superior to any other in withstanding the effects of weather. In many familiar products of everyday life this substance plays a part. Leather goods owe to it their very fine rich black colour, while for tinting purposes button manufacturers have no equal substitute. Stove and shoe polish manufacturers are unanimous in its praise.

Other uses for carbon black are for typewriter ribbons, for carbon copying paper and for mitigating the grating sound from phonograph records. Many other minor uses are found for it.

The output of carbon black in the United States for 1920 amounted to 51,321,892 lb., of which 40 per cent. was used in the rubber industry, 35 per cent. in the manufacture of printing inks, 10 per cent. for miscellaneous uses. The balance was exported, but it is expected that the increasing demand for the substance in the United States will equal production before long. There seems to be, therefore, an opportunity to establish a large Canadian industry in this product.

The utilisation of natural gas for the production of carbon black is possibly an economic waste where the current supplies of gas can be more fully utilised, but in a region such as Alberta, where population is relatively scarce, and industrial manufacture is as yet not on a very large scale, the enormous quantities of natural gas which must otherwise be largely unutilised might well be applied to the production of carbon black. The price of the material during 1921 was about sixpence a lb. It is obvious, therefore, that a large revenue might be derived from the many millions of cubic feet of natural gas that daily go to waste, if it were utilised as a source of carbon black.

W. G. R.

Chas. Page & Co., Ltd.

Business Extensions in Manchester and Glasgow

THE firm of Chas. Page and Co., Ltd., of 47–51, King William Street, London, announce that in consequence of the continued extension of their business they are removing their branch offices in Manchester and Glasgow on the 15th inst. to larger and more convenient premises. The Manchester branch, which was established some years ago and has steadily grown in dimensions, will in future be at 422–425, Royal Exchange, Manchester (Telephone number: Central, 1882; telegrams: "Paganini," Manchester). The offices will thus be in direct touch with the Exchange, the natural centre of Manchester's commercial activity, and will be still more favourably placed than at present for the rapid transaction of business. The Glasgow branch, which was only opened a few months ago, has very quickly justified its establishment. It is now being transferred to 31, St. Vincent Place, Glasgow (Telephone: Central 452; telegrams: "Paganini," Glasgow), and will thus have the advantage of a self-contained suite of rooms in one of the best business streets in the city. These changes are in pursuance of the firm's policy of conducting business as nearly as possible "on the spot," and thus keeping in the closest touch with the latest market movements. It is interesting to hear that the firm's acceptance of the sole selling agencies of the Southdown and other chemical companies has proved extremely satisfactory, and that they are doing a very good business in British-produced dyestuffs.

Colouring of Poisons

As a result of recent suggestions that poisons should be coloured in a manner which would make them easily recognisable as such, manufacturers of arsenical weed-killer have consulted the British Dyestuffs Corporation, Ltd., regarding the best method of colouring that poison in future. Interviewed by a Press representative on June 3, Dr. A. T. de Mouilpied pointed out the disadvantages of charcoal for this purpose and suggested the use of a dyestuff as a more satisfactory method. Arsenic could, he said, readily be dyed red. Strychnine would, of course, require a dye known to be harmless for internal consumption. Dr. Mouilpied also pointed out that the United States Legislature have already passed as suitable colouring for foodstuffs light green, S.F. Ponceau, orange I, carmoisine and Bismarck brown. Any of these, he said, would serve the present purpose. As only small quantities would be required, their use would add very slightly to the cost of manufacture.

Birthday Honours List

THE customary list of honours conferred upon the occasion of the King's birthday includes peerages for Sir Robert Hudson Borwick, of George Borwick and Sons, Ltd., and Sir William Vesty, managing director of the Union Cold Storage Co., Ltd., who has devoted his life to the production and preservation of food supplies by refrigeration. Mr. W. R. D. White, head of the firm of Timothy White and Co., chemists and merchants, receives a baronetcy, and Dr. E. J. Russell, director of the Rothamsted Experimental Station, is made a knight. In the Colonial Office List Mr. Alwin Robinson Dickinson, the British Phosphate Commissioner, becomes a member of the Order of St. Michael and St. George. The Kaisar-i-Hind Medal of the First Class for Public Services in India has been awarded to Mr. Ernest Hanbury Hankin, Honorary Fellow of Allahabad University, and late Chemical Examiner to the Government of the United Provinces.

Dyestuffs Research Developments

New Laboratories at Blackley

THE extension of the Blackley works of the British Dyestuffs Corporation, Ltd., is now practically completely equipped and, it is hoped, will be ready for use on Monday next. The new block of buildings will take over departments which have been working elsewhere, and will allow room for their proper development, providing particularly for chemical research. Professor Green and his staff of 33 chemists have been working in the eight new chemical research laboratories already for several months, and in the dye-house block—a separate part of the new building—the laboratory for experimental work on calicoes and leathers and the laboratory concerned with pigments and paper colours have both been running some time. In the dye-house there are altogether six newly-housed and equipped sub-departments, of which these are two. Of the others, one is engaged in research on the actual application of colours to materials and in testing experimental dyes; one is purely used for standardising colours, another is a general dyehouse.

The completion of this new block will, it is claimed, provide the works with a dyehouse the equal of any other in Europe, and will provide the very best means for answering technical queries of all kinds. An official of the Corporation states that over a hundred inquiries reach the works every week, and they range over the whole field of industry.

Any new dye will be tested for its characteristic "looseness" of "fastness," and will be annotated with a full report of its behaviour under different conditions. The chemical research department is a separate institution. Its experiments and tests are pursued on a line laid down after a consultation of heads, or may follow purely personal suggestion. The manufacturing side of the works is no concern of this department. It is only concerned with research, and when it produces anything hands it out to the dyehouse, where its possible uses are tested. It is felt that in an institution of this sort complete tests can be made, and all queries and complaints can be properly investigated.

Contracts Open

Tenders are invited for the following articles. The latest dates for receiving tenders are, when available, given in parentheses:

BULGARIA (June 26).—500 tons creosote and 50 tons zinc chloride. Full particulars from Department of Overseas Trade (Room 52), 35, Old Queen Street, Westminster, London (Reference No. D.O.T. 8269/F.E./C.P.).

SOUTH AFRICA (June 26).—Disinfectant powder (about 16,800 lb.) Particulars from Department of Overseas Trade, (Room 52), 35, Old Queen Street, Westminster, London. (Reference No. D.O.T. 8738/E.D./C.P.).

LAMBETH (June 13).—Lime, etc. Particulars from and tenders to J. L. Goldspink, Guardians' Offices, Kennington Road, London.

INDIA (June 23).—Sodium nitrate. Particulars from and tenders to the Director-General, India Store Department, Belvedere Road, Lambeth, London.

HAMMERSMITH (June 14).—Soap, etc. Particulars from and tenders to W. H. Glanville, 206, Goldhawk Road, Hammersmith, London.

PADDINGTON (June 21).—Soap and oilman's goods. Particulars from and tenders to P. Biddulph Hancock, 313-319, Harrow Road, London.

CHELSEA (June 16).—Drugs. Forms from and tenders to the Secretary, Chelsea Hospital for Women, Arthur Street, Chelsea, London.

LONDON (June 12).—Bar, toilet and soft soaps, and soap and metal polishing, etc., powder. Forms from and tenders to the Controller of Supplies, H.M. Office of Works, King Charles Street, Westminster.

GLASGOW (June 12).—Glass, oils, paints, varnishes, pitch, creosote, tallow, soaps, greases, etc. Particulars from the Superintendent of Stores, No. 1 Graving Dock, Govan. Tenders to T. R. Mackenzie, 16, Robertson Street, Glasgow.

PORTSMOUTH (June 13).—Portland cement, oils, chemicals, greases, etc. Forms from V. G. Lironi, Vivash Road, Fratton, Portsmouth. Tenders to the Town Clerk, Town Hall, Portsmouth.

Optical Instruments Inquiry

A Further Adjournment

THERE was another sitting at the Hotel Windsor, Victoria Street, London, on May 31, of the Committee appointed by the Board of Trade under the Safeguarding of Industries Act, to inquire into the complaint of British manufacturers of optical and other scientific instruments of unfair German competition.

Mr. T. W. H. Inskip, K.C., on behalf of seven firms, who are agents for German manufacturing concerns, said that every effort was made to keep German trade in the hands of authorised agents, who were not permitted to sell articles below certain prices. Illegitimate trade was being done from Germany; back-door methods were employed by commercial adventurers. Genuine agents were not putting goods on the market in competition with British goods at unfair prices.

Professor J. W. Bone said he represented the people engaged in scientific research, and in particular the Imperial College of Science, South Kensington. He complained that scientific workers were impeded and retarded by the duty on foreign instruments. Their work demanded the very finest apparatus that could be procured, and in many cases such could only be purchased from abroad. An increased price of instruments would be a hardship to students.

Several witnesses who were sole agents for German optical instruments and other goods, said that their trade had greatly fallen off since the imposition of the duty of 33⅓ per cent.

The Committee adjourned its inquiry until June 19.

Soap Manufacturers' Losses

THE statutory meeting of creditors of the Horton Manufacturing Co., Ltd., soap manufacturers, Rickmansworth, was held recently at the offices of Mr. Fincham, 3, Warwick Court, Holborn, London. Mr. Fincham reported that the company was formed in March, 1912, with a capital of £1,000, which was increased from time to time until at the date when he was appointed liquidator the capital was £15,000, of which £12,000 had been issued. The company did not appear to have commenced operations until 1916, and from then onward carried on a successful business until 1920, in which year a profit of £1,343, after providing for £195 paid by way of dividends, was carried forward. The accounts for the next year showed a loss of £5,947 and the following half-year ended March last a further loss of £1,334. The liabilities amounted to £15,656, of which £8,809 was due on debentures and a mortgage, and £6,847 was due to unsecured creditors. The assets amounted to £13,530, leaving a deficiency of £2,126. In April this year the company found itself in a very precarious position owing to the losses which they had sustained, and the debenture holders under their power took possession and appointed him their receiver, and it was shortly afterwards followed by a special resolution by the shareholders of the company that the business should be wound up voluntarily, and they in turn appointed him the liquidator. It was unanimously resolved by the creditors that Mr. Fincham should continue to act as liquidator and an informal committee of three of the largest creditors was elected to assist him.

Plastic Wood

PLASTIC wood is the name given to the latest accessory for the use of pattern makers which is to be exhibited at the Foundry Trades Exhibition which is being held in Birmingham from June 15 to 24. This product is manufactured by Necol Industrial Collodions, Ltd., a constituent company of Nobel Industries, Ltd., whose exhibit on Stand No. 115, Block G, will consist of specimens of patterns built up entirely of plastic wood, of jobbing patterns where it has been used to replace the broken or worn part and of decorative work made of plastic wood in moulds. A technical representative of the firm will be at the exhibition to answer inquiries and to explain the use and application of plastic wood, but the adaptation of it can be visualised when it is stated that plastic wood when first taken from its container is mouldable to any form, yet in a few hours it sets so hard that, although lighter in weight, it has all the characteristics of wood, except that it will not absorb moisture. When set hard it can be worked with the usual joiners' or carpenters' tools, and nails, screws, etc., can be driven into it without fear of splits occurring.

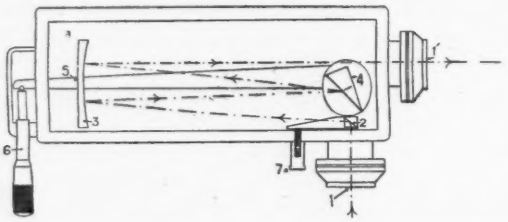
Two New Instruments

At the Royal Society's soiree on May 17 the firm of Bellingham and Stanley, Ltd., of London, exhibited by permission and on behalf of the Government Laboratory two entirely new scientific instruments of which a brief description is given below :—

A New Type of Spectrometer

This instrument has been designed for use as either a Wave-length Spectrometer, a Monochromatic Illuminator for the visible or ultra-violet, or an Infra Red instrument. The diagram indicates the optical parts. The light enters through the slit 1 and is reflected by the small right angle prism 2 on to the concave mirror 3. The concave mirror directs a parallel beam of light on to the prism 4 where the light is dispersed. It is reflected back by the reflecting surface of the prism once more on to the concave mirror 3 and is finally brought to a focus in a plane on the slit 1.

The dispersing prism is mounted on a suitable rotating table which may be turned by the long arm 5 and micrometer



screw motion 6. The screw motion head is suitably divided so that it can be set to pass any particular wave-length of light to the slit 1. Both slits of the instrument are adjustable for width, the jaws opening symmetrically and they also have a reducing wedge for modifying the length of the spectrum line. The slit 1 carries an eye-piece adapter so that the spectrum lines can be examined as they pass in turn across the slit.

When in use as an ordinary spectrometer or monochromatic illuminator for the visible region of the spectrum between wave-length 800 $\mu\mu$ and 395 $\mu\mu$, a glass dispersing prism of high refractive index is used together with polished silver on glass reflecting mirror 3.

For investigations in the ultra-violet or as a monochromatic illuminator in this region between wave-lengths 800 $\mu\mu$ and 200 $\mu\mu$, the glass dispersing prism is replaced by a 30° prism of quartz, and the concave mirror 3 is also changed for a quartz mirror with mercury tin foil amalgam backing which has a higher reflecting power in the ultra-violet. If desired, the eye-piece adapter and the slit 1 may be replaced by a flores-cent eye-piece to render the ultra-violet lines visible.

When in use as an infra-red spectrometer, the dispersing prism 4 is replaced by one of either quartz or rocksalt and the silver on glass reflecting concave mirror 3 is replaced.

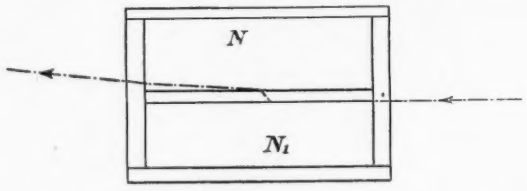
With a quartz dispersing prism investigations in the infra-red may be carried up to wave-lengths 4,000 $\mu\mu$, or if a rock-salt prism is used up to wave-length 39,000 $\mu\mu$. In infra-red measurements the eye-piece adapter in the slit 4 is replaced by a thermopile and is used in conjunction with a suitable galvanometer.

The great advantages of this type of instrument are—(1) The 30 dispersing prism is always used in the position of minimum deviation; (2) as a concave mirror is used no chromatic differences of focus are present, spectrum lines of all wave-lengths are in focus; (3) where in use as an infra-red instrument with rocksalt prism the whole instrument may easily be rendered airtight and in consequence the rocksalt prism will maintain its polish and be unaffected by atmos-pheric changes.

A Differential Refractometer

This instrument, which is based on the method described by Hallwachs, has been designed for the measurement of very small differences of refractive index between two liquids. The liquids are contained in a glass cell and are separated by a thin glass plate; the surface of the plate being approxi-mately in the plane of the axis of the observation telescope of the instrument. The light from the source passes through the liquid of lower refractive index at grazing incidence on the separating glass plate which it enters and then passes through the second liquid of higher refractive index at a small angle to the glass plate, the angle depending on the difference of refractive index in the liquids used.

When light passes from a medium of lower to higher refractive index a position of the ray can be found where the light will no longer pass but suffer total reflection at the contact surface. This position between light and darkness may be seen by the eye or examined by optical means. In the instrument shown the border line between light and darkness is focussed on to the cross wires of the telescope and the position of the liquid cell found and measured by the screw motion which rotates the cell with its supporting table.



The glass cell on its table is enclosed in a water jacketed cover.

The instrument measures refractive index differences to a very high degree of accuracy as a difference in index of one in the fifth place corresponds in the case of liquids having indices near to that of water to an angle of emergence of about $\frac{1}{4}$ degree. If desired the dispersion of the liquid in addition to its refrac-tive index may be determined.

The cell containing the solution in this new instrument is constructed entirely without cement, the surfaces of the glass plates and body being optically worked and then placed in optical contact. If desired, the separating glass plate and the end plates may be of quartz and measurements can then be continued into the ultra-violet. This Refractometer is particularly valuable for the detection of impurities in liquids.

"Electrician" Supply Tables

A good idea of the steady growth of the electricity supply industry may be gained from a study of "*The Electrician* Tables of Electricity Supply Undertakings," the 1922 edition of which has just been published. On the present occasion information of about 30 new stations has been included in the British section and over 100 in the Colonial and Foreign tables. Not only has there been a considerable increase in the number of entries, but substantial progress has also been made in the connexions to the mains, in the number of fresh consumers, in reductions of prices, and in other ways.

Apart from the particulars of the chief officials, the systems of supply, consumers' voltage, motors and total connexions, public lamps, steam raising and generating plant, prices charged for electric current, etc., hitherto given, information has now been added concerning the types of mains and dis-tributors, converting plant, showrooms, motor hiring and assisted wiring schemes. The whole of the entries, as well as the statistics of the British power companies, have been carefully revised, and it is confidently believed that the new edition of the Tables will prove indispensable to manufacturers of plant and apparatus, to electrical contractors and suppliers, to power users and others interested in electricity supply. The Colonial and Foreign Tables have been greatly extended, and no effort has been spared to make the statistics as accurate and as complete as possible for those parts of the British Empire in which there is a demand for electric plant and apparatus.

The present edition also gives particulars of the principal electric tramways and railways in the British colonies and in foreign countries. The tables are published at the usual price of 10s. 6d. post free, by Benn Brothers, Ltd., 6 and 8, Bouverie Street, London, E.C.4.

Chemical Matters in Parliament

Refund of Duties

Mr. Young, in reply to Mr. Foot (House of Commons, May 29), stated that, in view of the terms of Section 1 (5) of the Safeguarding Act, the sum paid on articles deleted from the Board of Trade lists are not repayable, and he regretted he was unable to make any exceptions.

Administrative Expenses

Mr. T. Thomson (House of Commons, May 30) asked the Financial Secretary to the Treasury if he could give an approximate idea as to the expenses caused to importers due to the collecting of the £21,000 under Part I. of the Safeguarding of Industries Act for the month of April, seeing that the collection involved the opening of many thousands of packages, for which the Post Office charged 6d. a package, which in one consignment represented 15s. against an amount of duty of 11d., and that on the larger packages at the docks and wharves the average charge for opening was 3s. 6d. per package, plus 5s. for the forwarding agent's charge for attendance in clearing of documents, apart from the question of delays, breakages due to repacking by unskilled persons, and the providing of the cash for the duties which traders hitherto have not been called upon to provide; and whether he would arrange that one or more packages out of a group could be examined instead of the bulk.

Mr. Young said he had no means of obtaining the information requested. As regards the charge made by the Post Office, he would refer Mr. Thomson to the reply given by the President of the Board of Trade to Mr. C. White on May 22. (*See* THE CHEMICAL AGE, Vol. VI., p. 701.) As regards the last part of the question, he would point out that while it was necessary for the protection of the revenue to maintain the right to require all imported packages to be opened for examination, it was the practice, in the absence of suspicion, and provided full particulars of contents were furnished, to require only a proportion of the packages of a consignment of goods entered as liable to Key Industry Duty to be opened, whether the importation took place as cargo or by parcels post.

British Dyestuffs Corporation

On the reassembly of the House of Commons on June 12 further questions will be put to the President of the Board of Trade with reference to the British Dyestuffs Corporation.

Mr. Kiley will ask whether Mr. Vernon Clay has resigned his directorship or management of the British Dyestuffs Corporation; if so, whether he can state the reason for Mr. Clay's action; whether several of the principal technical experts have recently left the service of the corporation; and whether, in view of the further fact that Dr. Levinstein has also resigned his directorship on the ground that, from absence of practical technical direction, the corporation was failing to achieve its object, he will appoint a Select Committee to inquire into the whole subject?

Mr. Kiley will also ask the president whether he is aware that negotiations are in progress for a working arrangement regarding production, distribution and prices between the British Dyestuffs Corporation and the principal dyemakers in Germany; and whether the Government have expressed their approval or disapproval of such a working agreement?

Major Barnes will ask whether the Board of Trade has received any report from the Government directors of the corporation as to the recent changes in the board of directors and, if so, whether the reports will be laid upon the table of the House?

American Chemical Exposition

THE 8th National Exposition of Chemical Industries will be held this year in the Grand Central Palace, New York, during the week September 11-16 inclusive. It will follow immediately upon the autumn meeting of the American Chemical Society. The organisers report that three full floors of the Grand Central Palace are already taken for the Exposition and part of the fourth. At present, it is stated, no fewer than 350 exhibitors have made definite arrangements regarding space.

Tribute to British Dye Makers

A Colour User's Testimony

LIEUT.-COMMANDER F. W. ASTBURY, in an article in the *Newcastle Daily Chronicle*, deals with some "myths" about British made dyes. It would, he says, be interesting to analyse the real origin and motive of the rude remarks about our British dye industry which have lately arisen from a handful of vociferous persons amongst us. Yet he imagined that these friends of the German dyer would be rather more disconcerted by a douche of cold truth upon the actual allegations which they had been sowing broadcast.

It was said, for example, that calico printers have not been able to get sufficient dyes to carry out their work. He was a calico-printer, and his works had never been on short time; on the contrary, they are even working overtime, and are booked up to the end of the year. He asserts, moreover, that he has never had the least difficulty in getting either from the home producer or the foreign producer the dyes which he required.

Whenever a consumer actually interested in the importation of a foreign dyestuff applied to the Licensing Committee with a well-founded case, there was no delay whatever in the issue of the necessary licence.

It is, he continues, quite untrue that British calico-printers are compelled to use inferior and useless British dyes. He is of the opinion that the British dye industry will flourish in spite of its detractors, and that already trade, slowly, perhaps, yet none the less steadily, is improving among our dyers and printers.

In a calico-printer's expenses, states Commander Astbury, colour is the smallest item of all. On a manufactured piece of 150 yards of cloth the total expenditure under that head is only 3 per cent., and, as a producer, he could honestly say that if he paid four shillings a lb. more for his colour it would not make the slightest difference in his sale price when spread over the huge production of a works.

In conclusion, he states his conviction that a British dye industry is the best guarantee of a reasonable world price for dyes.

Swiss Dye Profits

THE balance sheets now being circulated by the Swiss coal-tar colour-makers are, it is stated, much less satisfactory to the shareholders than those issued for many years past. The financial results have been adversely affected by the reduced turnover resulting from the world-wide depression in the dyeing and printing industries, and perhaps of still greater importance has been the price-cutting policy of the German companies, who have been making determined efforts to regain their pre-war position in neutral markets. Swiss firms are almost entirely dependent on the export trade, and the high exchange value of the Swiss franc has considerably handicapped them in coping with German competition. The Sandoz Chemical Works, Basle, reports a net profit of £39,000, as against £98,000 last year, and is paying 10 per cent., as against 18 per cent. last year and 30 per cent. in 1920.

Directorate of Phillips & Co., Ltd.

AFTER nearly forty years with Phillips and Co., Ltd., Coal Exchange, London, Mr. R. C. Phillips has relinquished his position as chairman and joint managing director, although his services are still retained by the company in an advisory and consultative capacity. Sir T. H. D. Berridge, K.B.E., has accepted the chairmanship of the company, and Mr. E. A. Phillips becomes sole managing director, the London and country departments being merged into one. Mr. C. S. Phillips resigned his position with the company on March 31 last. Mr. P. O. Roberts, who has been associated with the company for eighteen years, has joined the board and will act as general manager. Mr. A. Stronach and Mr. W. Lacon Threlford have also joined the board. Mr. R. C. Phillips having purchased the Liquid Fuel, Motor Spirit and By-products Department of the company as from March 31, will carry on that business in conjunction with Mr. C. S. Phillips under the style of Phillips and Son, at No. 28, Coal Exchange, London, pending removal to new offices at 62, Pall Mall, London.

From Week to Week

LORD LEVERHULME has arrived at The Hill, North End, Hampstead, London, from America.

It is announced that the FERTILISERS AND FEEDING STUFFS ACT is now operative in the Isle of Man.

MR. A. A. CAMPBELL SWINTON, F.R.S., has joined the board of W. T. Henley's Telegraph Works Co., Ltd.

MR. ROBERT KERR, sugar refiner, died on June 1, at his residence, "Westfield," Greenock, in his 72nd year.

Injections of the ethyl esters of CHAULMOOGRA OIL are claimed to effect a permanent cure in cases of leprosy.

MR. E. G. EDDY, of B. Hepworth and Co., Ltd., chemical manufacturers, Kidderminster, has been appointed a Justice of the Peace for the Borough.

MR. H. ROBERTS, a director of Joseph Crosfield and Sons, Ltd., soap manufacturers, of Warrington, has retired after 22 years' service in that capacity.

DR. E. S. SIMPSON, Mineralogist to the Government of West Australia, has received the additional appointment of Government Chemist and Analyst.

According to quotations from Moscow, the price of REFINED GLYCERINE is 34,000,000 roubles per pood, while that of the crude product is 23,000,000 roubles.

The King in Council has approved of the statute giving the University of Cambridge power to confer by diploma titles and degress in any faculty on WOMEN STUDENTS.

According to a Moscow message to the Russian Trade Delegation, no fewer than 106 American mining, metallurgical and other SKILLED WORKERS have arrived at Petrograd.

The work of the AMERICAN DYES INSTITUTE, which has, it is announced, ceased to exist, will be carried on in future largely by the Synthetic Organic Chemical Manufacturers' Association.

Messrs. A. F. Campbell, J. N. Greenwood, W. A. Harwood, J. Holker, J. E. Jones and J. Pearson, all of Manchester University, have been recommended for the degree of DOCTOR OF SCIENCE.

In connexion with the appeal for funds for the development of Bristol University, it is intimated that donations should be sent to the Appeal Director, University Appeal Offices, 51, Corn Street, Bristol.

AN EXPLOSION reported to have occurred on Monday at the Pont de Buis Powder Works, Finistere, resulted in serious injuries to five workmen, three of whom have already succumbed to their injuries.

The first number of "PSI," the new monthly magazine of the Faculty of Pure Science in the University of Birmingham, contains an article on "The Co-ordination Theory of Valency and Chemical Constitution," by Professor G. T. Morgan.

The death is announced at the age of 60 years, of MR. LIONEL WILLIAM STANSELL, F.I.C., public analyst for Maidstone, Rochester and Gravesend. He began his career with the late Mr. M. A. Adams, formerly county analyst for Kent.

At a meeting of the Council of the RUBBER GROWERS ASSOCIATION, held last week, a resolution was passed to the effect that no scheme of restriction which had not the cordial co-operation of the Dutch interests would be of real use to the industry.

On June 2 THE COURT OF APPEAL, by a majority, dismissed an appeal by Larrinaga and Co., Liverpool, on a special case in an arbitration between them and the Société Franco-Americaine des Phosphates de Medulla, Paris, from a judgment of Mr. Justice M'Cardie.

A new sales organisation is reported to have been formed by the ALSATIAN POTASH INDUSTRY under the name of "Société Alsacienne pour l'Extrême-Orient," with a capital of 100,000 f., in order to foster trade in potash, fertilisers, and chemical products with Eastern countries.

Mr. NEIL MCKECHNIE, senior partner of the Clyde Chemical Works, Capetown, left South Africa on May 12, on a business visit to England in connexion with pigments. Mr. McKechnie's address will be c/o Stavers and Anderson, 18-20, Creechurch Lane, Leadenhall Street, London.

THE ALIANZA NITRATE CO. announce that their Oficina Slavonia, which had not been worked since it was purchased by the company in 1904, was started in April, 1921, and produced 160,188 quintals of nitrate up to September, when it was closed down, having made sufficient nitrate to retain its quota.

A new type of LABORATORY GLASSWARE has been placed on the market by the Belgian glassworks at Val Saint Lambert, known as "Boromica." The new material is said to be an acid glass in which silica is partially replaced by boric acid. It is claimed to be particularly resistant to sudden changes of temperatures.

Statements have recently been made to the effect that the PHŒNIX CHEMICAL CO., LTD., of 10, Lloyds Avenue, London, were proposing to amalgamate with Lankshear, Wickstead and Co., Ltd., of 4, Broad Street Place, London. We understand that these negotiations have been discontinued, and that the amalgamation will not take place.

THE AMERICAN CYANAMID CO. reports that during April there was no production of ammo-phos at the New Jersey plant, operations there still being confined to the limited production of certain secondary products. At the Niagara Falls plant, the production of crude cyanamid was on the basis of approximately 46½ per cent. of capacity.

THE SOCIETY OF APOTHECARIES, who have carried on business for centuries at their hall in Water Lane, London, as wholesale and retail druggists, have now disposed of the wholesale business. Two months ago the retail portion was sold to Cooper, Son and Co., Ltd., and now the wholesale side has been bought by Randall and Wilson, Ltd., of Southhampton.

A paper entitled "Ring-chain Tautomerism. Part III. The Occurrence of Tautomerism of the Three-carbon (glutaconic) type between a Homocyclic Compound and its Unsaturated Open-chain Isomeride," by C. K. Ingold and E. A. Perren, will be read at the next ordinary scientific meeting of THE CHEMICAL SOCIETY, to be held on Thursday, June 15, at 8 p.m.

The Sixth International Exhibition of Rubber, Other Tropical Products and Allied Industries will be held in Brussels in April, 1924, under the patronage of H.M. the King of the Belgians. PROFESSOR WYNDHAM R. DUNSTAN, director of the Imperial Institute is honorary vice-president. All communications and inquiries should be addressed to Mr. H. G. Montgomery, Organising Director, 43, Essex Street, Strand, London.

The equipment of SIX NEW DYE-HOUSE LABORATORIES at Blackley, near Manchester, has been completed, and a staff of research workers engaged by the British Dyestuffs Corporation, Ltd., are to deal with the industrial uses of finished colours. The application of dyes to calico, to paint, printing inks, leather and to general textiles are each to be treated by a distinct staff in its own laboratory. Research work and the standardising of colours will have separate attention.

Whilst a workman was engaged in charging a still at the chemical works of CROWTHER & CO., LTD., chemical manufacturers, Amberley Road, Armley, Leeds, a sack of nitrate of soda caught fire and the workman and a colleague gallantly attempted to extinguish the flames, but the Corporation Fire Brigade were called in and after two hours' strenuous work prevented the spread of the fire to several tanks of vitriol and about 10 tons of nitrate of soda stored in the shed and extinguished the outbreak. The fumes from the nitric acid severely handicapped the firemen who suffered considerably from their effects.

Speaking at the annual conference of the Association of Teachers in Technical Institutions last week, Mr. J. PALEY YORKE said it was now forty years since any national inquiry on technical education was made. The advance of scientific knowledge and the development of the applications of science to industry and manufacture since that time had been tremendous. Technical education had developed too—for it was the connecting link between science and industry—but it had developed almost furtively and unobtrusively and beyond the recognition of many of those who imagined themselves to be its guardians.

Through the gift of Mr. F. N. Pickett, chairman of the Management Committee of St. Paul's Hospital, Holborn, London, a LABORATORY FOR RESEARCH is to form part of the new hospital in course of erection in Endell Street, London. A sum of £15,000 is being placed by Mr. Pickett in the hands of trustees to build and equip the laboratory, and towards an endowment to enable it to carry out research. Sir Ronald Ross has consented to become president of the trust. The laboratory will be known as the "Pickett-Thomson Research Laboratory," and will be under the direction of Dr. David Thomson, who worked under Sir Ronald Ross for five years.

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Patent Literature

Abstracts of Complete Specifications

179,201. Metallic Ores and Residues containing Metallic Oxides, Purification of. W. H. Dyson, Ringwood, Normandy, near Guildford, Surrey; and L. Aitchison, New Eldon Chambers, 46, Cherry Street, Birmingham. Application dates, October 28 and July 27, 1921.

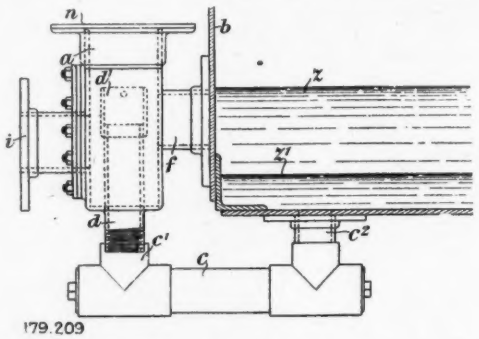
An oxidised ore or other metalliferous product containing metallic oxides is heated in a current of free halogen gas with or without a gaseous halide acid, such as chlorine and hydrochloric acid. This volatilises one or more of the metallic components as halogen derivatives and separates them. No carbon or sulphur-bearing reducing agent is used. The volatilisable metals may be separated from one another by selective formation and distillation of the halogen derivatives, either by changing the temperature or varying the nature of the halogen used. Two or more of the constituents may be volatilised and collected together, or they may be fractionally condensed. The temperature employed depends greatly on the nature of the raw material, *e.g.*, if a material consisting essentially of tungstic oxide is used, the tungsten may be volatilised at 600° C. in a current of chlorine and hydrochloric acid gas; if wolframite is used, a temperature of 1,000° C. is necessary. Chromium also is obtainable from a substance containing free chromium oxide more readily than from a natural compound such as chromite. The process is not applicable to the treatment of silica and oxides of aluminium and magnesium. In some cases it may be a metallic impurity which is thus volatilised and driven off, leaving a purified metallic value. This applies in the case of wolframite, the tin being volatilised while the tungsten compound remains. The process is preferably carried out in a furnace or retort having an acid-proof lining, such as a siliceous refractory, provided with an agitating device. In one example, a complex cobalt ore containing arsenic, iron, manganese and nickel, is heated to 600° C. in a current of hydrochloric acid gas to volatilise the arsenic and some of the iron and manganese. The temperature is then raised to 900° C., and chlorine passed over. Cobalt and nickel are thus volatilised and carried over into water. Other examples are given of the treatment of calamine, pyrolusite, malachite, crude lead chromate, chromite, and wolframite. See also Patents 176,428 and 176,729 (The Chemical Age, Vol. VI., pp. 492 and 493).

179,208. Plastic Materials or Articles having a Basis of Cellulose Acetate, Manufacture of. H. Dreyfus, 8, Waterloo Place, London, S.W.1. Application date, November 4, 1920.

When manufacturing sheets, slabs, rods, and other articles having a basis of cellulose acetate, the cellulose acetate is usually mixed with solvents and plastifying agents. The material is then worked up in mixing machines, rolling apparatus, and presses or extrusion dyes. It is then necessary to "season" the article, sometimes for a long period to allow the low-boiling solvents to evaporate. In this invention the seasoning is dispensed with. The air-dried cellulose acetate is mixed or kneaded with the plastifying agent and with a volatile diluent such as benzol, which is not a solvent for cellulose acetate. The mixture is then heated to drive off the volatile diluent, leaving the plastifier distributed uniformly in the acetate. The temperature must be higher than that used in making nitrocellulose celluloid, preferably about 100°-150° C. The usual agents for neutralising traces of acid, *e.g.*, urea, mono-, di- or tri-ethyl urea may be added. In an example, 100 parts of air-dried cellulose acetate are mixed with 30-40 parts of isomeric xylene-*o*-monomethyl sulphonamides (Patent 132,283, see The Chemical Age, Vol. I., p. 503), with or without 6-8 parts of triphenylphosphate or tricresylphosphate. The mixture is heated to 100°-150° C. during kneading, and to 90-100° C. during moulding.

179,209.—Separators Employed for the Separation of Liquids of Different Density. W. H. Bateman, 23, Great Winchester Street, London, E.C. Application date, November 8, 1920.

The apparatus is particularly applicable to the separation of water from the condensate produced in the distillation of crude oil in the presence of steam. The tank *b* contains the oil and water to be separated, the oil level being at *z* and the water level at z^1. The lower part of the tank *b* com-



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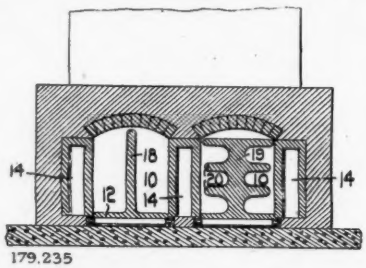
municates by a pipe c^2, *c*, c^1, with the lower part of a compartment in a casing *a*. The inflow pipe into this compartment is formed as a vertical overflow pipe having an adjustable upper edge d^1 for varying the level at which the water overflows. A pipe *f* is connected from the tank *b* to conduct the oil to another compartment in the casing *a*. The oil compartment is provided with an overflow weir to determine the maximum height of the oil column, while the oil overflows into another compartment, and thence to the outlet *i*. Another compartment, provided with a sight window, communicates with the oil and water compartments respectively, so that the visible levels correspond to those in the tank *b*.

179,235. Coke Ovens. L. L. Summers, 140, Nassau Street, New York. Application date, January 5, 1921.

The apparatus is of the kind in which a rectangular oven is heated by flues in the side walls. When such an oven is provided with a reciprocating horizontal floor to which the fuel is fed, it is found that the narrowing of the oven necessary for efficient heat conduction does not provide sufficient frictional resistance between the fuel and the floor, while the resistance



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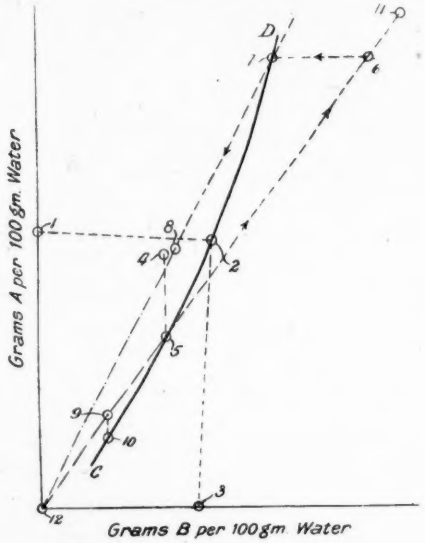
between the fuel and the walls is increased. To overcome this difficulty, the floor 12 is provided with a central vertical wall 18 projecting upwards. A largely increased reciprocating surface is thus provided in contact with the fuel and the progression of the fuel through the retort is facilitated. A modified form of projecting rib is shown at the right-hand side of the illustration. The main rib 19 is provided with lateral projections 20, forming pockets in which the fuel is compressed. The fuel may be introduced into the oven in a raw condition, or it may be previously partly distilled and in a plastic condition.

179,287. Separating Solids by Crystallisation from Solvents, Process for. F. W. Berk and Co., Ltd., 1, Fenchurch Avenue, London, E.C.3, and H. V. A. Briscoe, 32, Blenheim Gardens, Cricklewood, London, N.W.2. Application date, February 1, 1921.

In the usual methods for separating solids by fractional crystallisation from solutions, the mixture is dissolved to a high concentration, and the mixture is allowed to cool and

crystallise. The crystallisation may be continued to obtain a product in which one constituent A is present in a higher proportion than in the original mixture, or the solution may be cooled only as long as constituent A is deposited pure. The first method necessitates further separation, and the second necessitates further concentration and crystallisation, while the yield of the pure product is not good. In this process, a new method is employed which is illustrated by a solubility diagram. The curve CD represents the concentra-



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tions of two ingredients A and B in the proportions in which they are in equilibrium in a saturated solution at a given temperature. If the concentration of a solution is represented by a point 4 and the solution is cooled, pure A will be deposited as represented by a line 4, 5, while at the point 5, a mixture will be deposited. At this point, if solvent alone is added, the ratio of A to B does not change and the composition is represented by a line 5, 9. It is preferred to remove solvent by means of heat, so that conditions are represented by the line 5, 6. At the point 6, the solution is cooled until the conditions are represented by the point 7, during which time pure B is deposited. Solvent is then added until the concentration is represented by the point 8. The position of the point 6 is so chosen that the final point 8 is close to the point 4, so that the cycle can be repeated. A slightly modified cycle is adopted in the case of mixed solutions having a solubility curve which is concave downwards. The process is described in detail as applied to a crude mixture of potassium and sodium nitrates containing 30-40 per cent. of potassium nitrate, obtained from Chilian nitrate.

179,309. Thorium Nitrate, Manufacture of. H. Wade, London. From The Lindsay Light Co., 161, East Grand Avenue, Chicago, Ill., U.S.A. Application date, February 3, 1921.

Monazite sand is subjected to magnetic separation to remove most of the ilmenite, and then treated with concentrated sulphuric acid for four hours, up to a temperature of 180°-200° C. The mixture is cooled slowly to about 160° C. and then heated again to 300° C. and allowed to cool. The mixture is then run into cold water, stirred, filtered, and washed till the filtrate is no longer acid. The filter cake is a grey mud containing all the thorium as a phosphatic compound. This product is boiled with caustic soda solution, allowed to settle, and filtered, leaving the hydroxide. This material is treated with sulphuric acid and water to obtain a solution of the sulphate, which is converted into the fluoride by treating with hydrofluoric acid. The solid fluoride is filtered off and treated with a solution of sodium bicarbonate forming a solution to which caustic soda is added to precipitate the hydroxide. The hydroxide is converted into chloride by solution in hydrochloric acid, and again converted into sulphate by adding sulphuric acid. The sulphate is treated with ammonia to obtain the hydroxide, and then with hydrochloric acid again to obtain the chloride. Sulphuric acid is again added to obtain the sulphate which is treated as before to precipitate thorium hydroxide. The final purified product, thorium nitrate, is obtained by solution in nitric acid.

179,463. Crucible Furnaces. F. G. Penny, 8, Blendon Terrace, Plumstead, London, S.E.18. Application date, July 7, 1921.

A crucible furnace is provided with a narrow outlet at the top which conducts the hot gases through a diverging passage to the bottom of an auxiliary chamber containing a similar crucible. The gases pass then through a similar diverging flue to the main flue. A branch from the blast pipe is arranged in the main flue to effect a suction through the auxiliary flue.

179,494. Filtering Apparatus. E. W. W. Keene, 15-19, Coronation Road, Bristol. Application date, March 11, 1921.

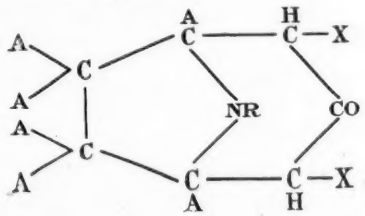
The filter is of the kind in which a rotary filtering member is partly submerged in the liquid to be filtered, and a partial vacuum is maintained within the member. To control such a filter, a rotary valve is provided comprising a drum having radial parts connected with the interior of the filter drum. The casing is provided with ports for filtrate, low vacuum wash solution, pressure air for removing filter cake, and pressure air exhaust, and the ports are separated by members which are adjustable circumferentially to control the quantity of wash water or the period of filtration in accordance with differences in the nature of the material treated.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—159,194 (P. Brat), relating to recovery of ammonia from peat and the like, see Vol. IV., p. 541 ; 159,494 (C. Kulas and C. Pauling), relating to resinous phenol formaldehyde condensation products, see Vol. IV., p. 566 ; 163,685 (Chemische Fabrik Wiessenstein Ges.), relating to distillation of sulphuric acid.

International Specifications not yet Accepted

177,807. Nortropinone derivatives. E. Merck (Firm of), 250, Frankfurterstrasse, Darmstadt, O. Wolfes, 29, Hoffmannstrasse, Darmstadt, and H. Maeder, 31, Wittmannstrasse, Darmstadt, Germany. International Convention date, April 4, 1921.

The invention is for obtaining nortropinone and its derivatives having the general formula—



where A is hydrogen, alkyl radicle, or *nil*, R is hydrogen, hydrocarbon radicle, or substituted hydrocarbon radicle, and X is hydrogen, carboxyl or CN. These compounds are obtained by condensing 1 : 4-dialdehyde or -diketo compounds with ammonia or a primary amine and a derivative of acetone. Examples are given of the preparation of nortropinone-monocarboxylic ester, N-benzyl nortropinone, and other compounds.

177,809. Cellulose esters and ethers. L. Lilienfeld, 1, Zeltgasse, Vienna. International Convention date, April 2, 1921.

Cellulose esters and ethers are manufactured from derivatives of cellulose containing alkyl or aralkyl groups which are insoluble in water but soluble in alkali solutions. The preparation of such derivatives is described in 177,810 (p. 772). The whole reaction mixture or solution may be partly or wholly freed from water and then treated with the esterifying or

alkylating agent. Alternatively, the alkali-soluble derivative may be isolated and then converted into ester or ether. The alkylation may be effected in one or two stages, the first stage being, for example, an ethyl ether soluble in water. The use of a large excess of the reagents is not necessary in this process. Acetates, formates, nitrates, and ethyl ethers from them are described in examples.

177,810. CELLULOSE ETHERS. L. Lilienfeld, 1, Zeltgasse, Vienna. International Convention date, April 2, 1921.

Cellulose or a derivative is heated with an alkylating or aralkylating agent, and a caustic alkali in insufficient quantity to produce an alkali-soluble product. These products are insoluble in water and organic solvents, and soluble in alkali solutions. The starting material may be cellulose, cellulose hydrate insoluble in alkali, hydrocellulose hydrate or oxycellulose, an aliphatic acid ester of cellulose, or a derivative such as a xanthate soluble in alkali. The starting material, if insoluble in alkali, is impregnated or mixed with the alkali and then heated in comminuted form with an alkyl or aralkyl ester of an inorganic acid. If the starting material is soluble, the whole process is effected in solution. The quantity of alkali need not exceed that of the dry cellulose, but larger quantities may be used, provided the concentration is not above 25 per cent. If the derivatives are insoluble in the reaction mixture, they are washed with water, acid, alcohol, alcohol-ether, and then dried or dissolved in alkali. These derivatives are precipitated from their alkaline solutions by the usual media employed with viscose, and from their mineral acid solutions by water, alcohol, glacial acetic acid and acetone. Many examples are given, together with their applications in the manufacture of films, threads, plastic compositions, paints, finishes, filling materials, binding materials, pigment media in textile printing, etc.

177,812. FURNACES. H. Moll, Rasselstein, near Neuwied, Germany. International Convention date, April 2, 1921.

Reverberatory and open hearth furnaces which are heated by gas are arranged so that the air supply flue joins the gas flue before reaching the furnace so that the gas current is enveloped by an air current. Gas enters by a passage which is surrounded at one point by the air flue, preferably of elliptical cross section, and the gas and air then pass on to the furnace. As an alternative, the gas may enter the air flue which is of larger diameter, and the admission in either case may be from above or below.

LATEST NOTIFICATIONS.

180,625. Process of producing low-boiling hydrocarbons suitable for motor fluid and for other purposes. Melamid, M. May 25, 1921.

180,657. Apparatus for treating hydrocarbon oils. Linten, E. O. May 26, 1921.

180,675. Chemical treatments, particularly those used in metallurgy for winning or refining metals. Coulbeaux, P., and Thomas, F. E. May 25, 1921.

180,680. Manufacture of zinc oxide. New Jersey Zinc Co. May 27, 1921.

180,696. Process of evaporating solutions. Schicht Akt.-Ges., G., and Schnetzer, K. May 27, 1921.

Specifications Accepted, with Date of Application

159,164. Phenol-aldehyde condensation products, Production of. Condensite Co. of America. February 19, 1920.

159,880. Motor fuels containing alcohol, Process for preparing. Chemical Fuel Co., of America. March 9, 1920.

160,455. Zinc from lead-slags, zinc-retort residues, poor zinc ores, or the like, Method of extracting. Rheinisch-Nassauische Bergwerks & Hutten-Akt.-Ges., and A. Spieker. March 17, 1920.

160,760. Ores, Process for the reduction of. C. A. Stevens March 26, 1920.

160,765. Aromatic oxy-aldehydes and their derivatives, Process for the manufacture of. Soc. Chimique des Usines du Rhone, Anciennement Gilliard, P. Monnet, et Cartier. March 24, 1920.

161,156. Zinc oxide, Manufacture of. New Jersey Zinc Co. March 31, 1920.

170,840. Nitric acid, Process for the production of concentrated. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. October 27, 1920.

179,964. Oil-bearing shales or other like materials, Retorts for the distillation of. J. S. Black. July 29, 1921.

179,978. Furnaces. A. W. Bennis. January 13, 1921.

179,982. Sodium ferro-cyanide, Manufacture of. F. F. Delarozière. January 17, 1921.

179,991. Naphthalene and other volatile solid organic bodies, Purification of. C. E. Andrews, C. Conover, K. B. John, and C. E. Ruth. January 19, 1921.

179,992. Ferro-chromium alloys, Manufacture of. W. B. Ballantine. January 19, 1921.

180,016. Formaldehyde or its polymers from mixtures of carbon monoxide and hydrogen, Process for the preparation of. E. J. Lush. February 12, 1921.

180,021. Oxidised ores, Treatment of. W. G. Perkins. February 14, 1921.

180,023. Drying solid substances, Apparatus for use in. N. S. Kilner. February 14, 1921.

180,024. Purifying gases, Process for. J. Y. Johnson (*Badische Anilin und Soda Fabrik*). February 14, 1921.

180,027. Fertilisers containing phosphoric acid and potash, Process for the production of. T. Haege. February 15, 1921.

180,081. Peat and like substances, Method of distilling and gasifying. A. A. F. M. Seigle. February 24, 1921.

180,089. Titanic oxide products, Manufacture of composite. B. E. D. Kilburn (*Titanium Pigment Co., Inc.*) February 28, 1921.

180,110. Sodium pentaborate direct from boron ores, Process for the production of. A. A. Kelly and B. D. Jones. March 12, 1921.

180,118. Hydrocyanic acid, Method of generating. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, and O. Liebnecht. March 15, 1921.

180,175. Carbon bisulphide, Manufacture of. Courtaulds, Ltd., and A. E. Delph. April 23, 1921.

180,180. Nitrates, Treatment of—particularly those used for fertiliser purposes. R. G. Browning and H. G. T. Boorman. April 27, 1921.

Applications for Patents

British Dyestuffs Corporation, Ltd., Green, A. G., Saunders, K. H., and Adams, E. B. Manufacture of intermediates for production of colouring-matters. 15081. May 29.

Ashcroft, E. A. Treatment of sulphide ores, etc. 15562. June 2.

Baker, Sons, and Perkins, Ltd., J., and Gilderdale, C. W. Grading grains of material contained in current of fluid. 15566. June 2.

Beasley, W. H., and Perkins, W. G. Refining of copper oxide. 15597. June 2.

Bloxam, A. G., and Chemische-Fabrik Griesheim-Elektron. Manufacture of black azo dyestuffs. 15065. May 29.

Butonia Gomb és Vegyitermékek Gyára Részvenytársaság. Process for producing artificial masses by solidifying colloid material. 15570. June 2. (Hungary, June 3, 1921.)

Damiens, A. A. L. J., Piette, O. J. G., and Loisy, M. C. J. E. de. Extracting sulphur from gases containing sulphuretted hydrogen. 15342. May 31. (France, June 3, 1921.)

Elliott, W. S. Separation of air and dissolved gases from liquid. 15082. 15083. 15084. May 29.

Galbraith, W. L., Tallantyre, S. B., Murdoch, D. G., and Siderfin, N. E. Reduction of organic compounds. 15585. June 2.

Galbraith, W. L., Treatment of organic compounds with nitrous acid. 15586. June 2.

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of 2 : 3 diamino anthraquinone. 15362. May 31.

Laurie, A. P. Formation of hydrated silica cements. 15245. May 31.

Pollak, F. Manufacture of condensation products from urea, thiourea, or their derivatives and aldehydes. 15218. May 30. (Austria, May 31, 1921.)

Schnetzer, K., and Schicht Akt.-Ges., G. Process of evaporating solutions. 15053. May 29. (Czecho-Slovakia, May 27, 1921.)

Soc. of Chemical Industry in Basle. Manufacture of carbonyl derivatives of L-naphthol. 15190. May 30. (Switzerland, May 31, 1921.)

Stevens, H. P. Accelerators for rubber manufacture. 15169. May 30.

Techno-Chemical Laboratories, Ltd., and Testrup, N. Evaporation, concentration, drying, etc. 15347. May 31.

Traun's Forschungslaboratorium Ges., H. O. Filter-presses. 15388. June 1. (Germany, July 5, 1918.)

Warren, A. I. G. Producing metallised surfaces of rubber compounds containing sulphur. 15183. May 30.

Wood, K. R. Treatment of animal and vegetable fibres in the application of vat dyes. 15402. June 1.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

LONDON, JUNE 8, 1922.

BUSINESS has been quiet this week, and markets are still under the influence of the holidays, many works in the North being closed for the whole week.

Values continue firm, and prices of imported products tend to harden.

Export trade has been satisfactory, and there has been an increased inquiry.

General Chemicals

ACETONE.—Spot supplies are very scarce, and the value is firm.
ACID ACETIC has again been active, and the price tends to become higher.
ACID CITRIC is practically unobtainable on the spot, and has registered a sharp advance.
ACID FORMIC continues in fair request, with prices nominally unchanged.
ACID LACTIC is without change.
ACID OXALIC has only been in fair request at last quoted figures.
ACID TARTARIC is scarce, and the price has advanced.
BARIUM CHLORIDE remains almost unobtainable on the spot, and it is very difficult to obtain supplies, even for forward position.
CREAM OF TARTAR has advanced.
FORMALDEHYDE is weak, but all the same visible supplies are diminishing and higher prices would not be unexpected.
LEAD ACETATE has advanced, and supplies are scarce.
LEAD NITRATE is firmer, and the demand is fair.
LITHOPONE is very firm, with only small supplies available.
POTASSIUM CARBONATE continues to hang fire.
POTASSIUM CAUSTIC is nominally unchanged, with little business to report.
POTASSIUM PERMANGANATE is scarce and firm.
POTASSIUM PRUSSIATE has advanced in price, and spot supplies are practically unobtainable.
SODIUM ACETATE maintains its advance and is scarce.
SODIUM BICHROMATE is a shade better, and the price of the imported product tends to advance.
SODIUM NITRITE has been inactive.
SODIUM PHOSPHATE is in better request, without change in value.
SODIUM PRUSSIATE remains extremely scarce, and the price is very firm.
WHITE LEAD is without change.
ZINC OXIDE is scarce and firm.

Coal Tar Intermediates

Business during the past week has, of course, been affected by the holiday, since when matters have been fairly quiet. A moderate amount of inquiry, however, is about, with small business passing.

ALPHA NAPHTHOL continues firm, with stocks low.
ALPHA NAPHTHYLAMINE is steady, and small spot quantities are available.
ANILINE OIL and SALT are quiet and easy, but export inquiries have been received for the former.
BENZIDINE BASE is without special feature.
BETA NAPHTHOL has been inquired for, and is without change in price.
BETA NAPHTHYLAMINE.—Orders have been booked, and the price is unaltered.
DIMETHYLANILINE is in request at last quoted price.
DINITROPHENOL.—Small orders have been booked.
DIPHENYLAMINE continues very firm, with small stocks available.
" G " SALT.—Inquiries have been received on home account.
" H " ACID is firm, with but little available for spot delivery.
NITROBENZOL is steady, with the usual business passing.
PARANITRANILINE is the turn easier.
PARAPHENYLENEDIAMINE is firm, and fair orders have been received.
RESORCIN has been inquired for.

Coal Tar Products

The market in coal tar products is influenced slightly by the fact that many works are shut down for a few days during the Whitsuntide holidays. Prices generally, however, remain the same.

90's BENZOL is worth 2s. per gallon on rails.
PURE BENZOL is in poor demand, and is not worth more than 2s. 4d. on rails.
CREOSOTE keeps very firm, and is worth 4¾d. per gallon in the Midlands, and 5¼d. to 5½d. per gallon in London.
CRESYLIC ACID is rather weaker than has been the case over the last two weeks, and the recent improvement in this article has not been maintained. This is probably due to a certain amount of speculative buying on the part of certain merchants who are finding difficulty in disposing of the quantities which they have bought. The Pale quality, 97/99%, is worth about 2s. 3d. per gallon on rails, while the Dark quality, 95/97%, is worth 2s. to 2s. 1d.
SOLVENT NAPHTHA is weak, and is worth about 1s. 9d. per gallon on rails.
HEAVY NAPHTHA is also worth about 1s. 9d.
NAPHTHALENE is in poor demand, and the price remains unchanged.
PITCH.—The market is unchanged, and owing to the hot weather which has been experienced recently business is practically at a standstill.

Sulphate of Ammonia

There are no new features to report. The demand for the present season is at an end, and very little business has been reported for forward delivery. The export demand is satisfactory.

Current Prices

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	8	to	0	1	10
Acetone oil	ton	77	10	0	to	80	0	0
Acetone, pure	ton	72	0	0	to	73	0	0
Acid, Acetic, glacial, 99–100%	ton	66	0	0	to	67	0	0
Acetic, 80% pure	ton	43	0	0	to	44	0	0
Arsenic, liquid, 2000 s.g.	ton	67	0	0	to	70	0	0
Boric, cryst.	ton	60	0	0	to	65	0	0
Carbolic, cryst. 39–40%	lb.	0	0	6	to	0	0	6½
Citric	lb.	0	2	5	to	0	2	6
Formic, 80%	ton	65	0	0	to	66	0	0
Gallic, pure	lb.	0	2	11	to	0	3	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	40	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.	ton	30	0	0	to	31	0	0
Oxalic	lb.	0	0	8¼	to	0	0	8½
Phosphoric, 1.5	ton	38	0	0	to	40	0	0
Pyrogallic, cryst.	lb.	0	6	0	to	0	6	3
Salicylic, Technical	lb.	0	0	10½	to	0	1	0
Salicylic, B.P.	lb.	0	1	3	to	0	1	5
Sulphuric, 92–93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	4½	to	0	1	4½
Alum, lump	ton	13	0	0	to	14	0	0
Alum, chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	10	10	0	to	11	0	0
Aluminium, sulphate, 17–18%	ton	11	10	0	to	12	0	0

	Per	£	s.	d.		£	s.	d.
Ammonia, anhydrous	lb.	0	1	8	to	0	1	10
Ammonia, .880	ton	33	0	0	to	35	0	0
Ammonia, .920	ton	21	0	0	to	23	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	78	0	0	to	80	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	42	0	0	to	44	0	0
Barium, carbonate, 92–94%	ton	12	10	0	to	13	0	0
Barium, Chlorate	ton	60	0	0	to	68	0	0
Barium Chloride	ton	19	0	0	to	20	0	0
Nitrate	ton	27	10	0	to	30	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	3
Bleaching powder, 35–37%	ton	13	0	0	to	13	10	0
Borax crystals	ton	29	0	0	to	33	0	0
Calcium acetate, Brown	ton	9	0	0	to	9	10	0
" " Grey	ton	13	0	0	to	13	10	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	10	0	to	7	0	0
Carbon bisulphide	ton	50	0	0	to	52	0	0
Casein, technical	ton	50	0	0	to	65	0	0
Cerium oxalate	lb.	0	4	6	to	0	4	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	28	10	0	to	29	0	0
Cream Tartar, 98–100%	ton	115	0	0	to	117	10	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	67	10	0	to	70	0	0
Formusol (Rongalite)	lb.	0	2	6	to	0	2	9
Glauber salts, commercial	ton	5	10	0	to	6	0	0
Glycerine, crude	ton	70	0	0	to	72	0	0
Hydrogen peroxide, 12 vols.	gal.	0	2	5	to	0	2	6
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	42	0	0	to	43	0	0
Carbonate (White Lead)	ton	42	0	0	to	46	0	0
Nitrate	ton	46	10	0	to	48	10	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	25	10	0	to	26	0	0
Magnesium chloride	ton	10	0	0	to	10	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	8	0	0	to	8	10	0
Sulphate (Druggists')	ton	13	10	0	to	14	10	0
Manganese, Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	60	0	0	to	62	0	0
Methyl acetone	ton	60	0	0	to	65	0	0
Alcohol, 1% acetone	ton	65	10	0	to	66	0	0
Nickel sulphate, single salt	ton	49	0	0	to	51	0	0
Ammonium sulphate, double salt	ton	51	0	0	to	52	0	0
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	6¾	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride, 80%	ton	12	0	0	to	12	10	0
Chlorate	lb.	0	0	4½	to	0	0	5
Meta bisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	0	9	to	0	0	10
Prussiate, red	lb.	0	4	6	to	0	4	9
Prussiate, yellow	lb.	0	1	3	to	0	1	3½
Sulphate, 90%	ton	13	0	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	23	10	0	to	24	10	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	5½	to		—	
Bisulphite, 60–62%	ton	23	0	0	to	24	0	0
Chlorate	lb.	0	0	3¾	to	0	0	4
Caustic, 70%	ton	22	10	0	to	23	0	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	1	9	to	0	2	0
Hyposulphite, commercial	ton	13	10	0	to	14	0	0
Sodium Nitrite, 96–98%	ton	31	0	0	to	32	0	0
Phosphate, crystal	ton	18	10	0	to	19	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	10½	to	0	0	11
Sulphide, crystals	ton	13	0	0	to	14	0	0
Sulphide, solid, 60–62%	ton	21	10	0	to	23	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	45	0	0	to	47	10	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	6	to	0	1	7
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	36	0	0	to	38	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	18	10	0	to	19	10	0

Coal Tar Intermediates, &c.

	Per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	1
Aniline oil, drums extra	lb.	0	1	0	to	0	1	1
Aniline salts	lb.	0	1	1	to	0	1	2
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	9	to	0	4	3
Benzidine, base	lb.	0	5	9	to	0	6	0
Benzidine, sulphate	lb.	0	5	9	to	0	6	0
Benzoic acid	lb.	0	1	7½	to	0	1	9
Benzoate of soda	lb.	0	1	6	to	0	1	7
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	4	9	to	0	5	0
Betanaphthol	lb.	0	1	4	to	0	1	4½
Betanaphthylamine, technical	lb.	0	6	0	to	0	7	0
Croceine Acid, 100% basis	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	2	3	to	0	2	6
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	6	to	0	7	0
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	3	0	to	0	3	3
Naphthionate of Soda	lb.	0	3	0	to	0	3	3
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	10	0	to	0	10	5
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	10	0	to	0	10	6
Para-amidophenol, hydrochlor	lb.	0	10	6	to	0	11	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9

Recent Wills

Mr. William Barton, Birkdale, Lancs, a director of W. H. Dorman and Co., Ltd., Stafford .. £33,908

Mr. Richard Arthur Jones, Western Elms Avenue, Reading, partner in Tunbridge Jones and Co., wholesale chemists £7,691

Mr. Nelson Beaufoy Foster, Farnham Common, managing director of the British Oil and Cake Mills, Ltd., a director of British Cottonseed Products, Ltd., the British Extracting Co., and many of the subsidiary companies of the British Oil and Cake Mills, Ltd. £22,203

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

GLASGOW, JUNE 7, 1922.

THE past week brought fair inquiry, but the actual amount of business transacted left much to be desired. Prices generally are steady, the same applying to Continental offers.

In coal tar products there is nothing of importance to report.

Industrial Chemicals

ACID ACETIC.—Continues in fairly good demand, with prices about the same. Glacial 98/100%, £60 to £61 per ton; 80% B.P., £43 to £44; 80% technical for forward delivery, £38 c.i.f.

ACID BORACIC.—Crystals or granulated, £60 per ton; powder, £62 per ton in ton lots.

ACID FORMIC, 85%.—Quoted about £65 per ton.

ACID HYDROCHLORIC.—Price unchanged at 6s. 6d. per carboy ex works. Cheaper prices for large quantities.

ACID NITRIC, 80° TW.—Quoted £25 5s. ex works. In little demand.

ACID SULPHURIC.—Prices unchanged. 144°, £4 per ton; 168°, £7 5s. per ton; de-arsenicated £1 per ton more.

ALUMINA SULPHATE.—English make 14/15%, £8 5s. per ton; 17/18%, £10 per ton f.o.b. Continental make at about same prices c.i.f.

ALUM LUMP POTASH.—In little request. Continental make, £15 5s. to £15 10s. ex store.

AMMONIA CARBONATE.—Price unchanged, 4d. to 4½d. per lb. Moderate inquiry.

AMMONIA MURIATE.—Quoted £34 per ton f.o.r.

AMMONIA SULPHATE.—25¼%, £15 10s. per ton; 25¾% neutral, £16 13s. per ton ex works. June delivery.

AMMONIA SALAMMONIAC (CRYSTALS).—Inclined to be higher at £58 per ton.

ARSENIC, WHITE POWDERED.—In moderate request, £44 per ton ex quay.

BARIUM CARBONATE.—Quoted £12 to £13 per ton. A few export inquiries.

BARYTES.—Little inquiry. Home material, £3 15s. for grey, to £5 15s. for finest white. Numerous Continental offers at about same price.

BLEACHING POWDER.—English makers' price £14 per ton ex station.

BORAX.—Crystal or granulated, £29 per ton; powder, £30 per ton, minimum ton lots.

CALCIUM CARBIDE.—£20 per ton ex store.

CALCIUM CHLORIDE.—English makers' price £6 10s. per ton ex quay; Continental offers of £5 15s. per ton c.i.f.

COPPER SULPHATE.—A few inquiries for home consumption. Price £27 to £28 per ton ex quay.

GLAUBER SALTS.—Spot lots of fine crystals £5 per ton ex store.

GLYCERINE.—Prices are reduced £5 per ton all round, making Refined Pale Straw £79 per ton in ton lots, returnable drums.

LEAD.—Red, £36 10s. per ton; white, £50 10s. per ton. Little demand for either quality.

MAGNESIUM CHLORIDE.—Fair demand. Price £7 10s. to £7 15s. ex store.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial, £7 10s. B.P., £9 15s. per ton delivered.

NAPHTHALENE PURE CRYSTALS.—The market is very weak. Pure crystals are offering at £16 per ton ex works.

POTASSIUM BICHROMATE.—Makers' price unchanged at 6¾d. per lb. On offer at 6½d.

POTASSIUM CARBONATE, 88/92%.—In little demand. Spot lots at £29 per ton.

POTASSIUM CAUSTIC, 88/92%.—A few inquiries for small lots at £33 to £34 per ton.

POTASSIUM CHLORATE.—Price unchanged at 4½d. to 5d. per lb.

POTASSIUM NITRATE.—Moderate inquiry, £35 per ton ex store. Continental offers of £29 c.i.f.

POTASSIUM PERMANGANATE.—Quoted 10½d. per lb. ex station.

POTASSIUM PRUSSIATE YELLOW.—In fair demand at about 1s. 3½d. to 1s. 4d. per lb.

POTASSIUM SULPHATE, 90%.—Unchanged at £15 per ton.

SODIUM ACETATE.—Offered at £22 per ton c.i.f.

SODIUM BICARBONATE.—£11 per ton ex station; m.w. quality, £10 per ton.

SODIUM BICHROMATE.—English make 5¼d. per lb.

SODIUM CARBONATE (SODA CRYSTALS).—£6 per ton ex quay or station.

SODIUM CARBONATE (ALKALI 58%).—£9 12s. 6d. per ton ex quay. In little demand.

SODIUM CAUSTIC.—76/77%, £25 10s.; 70/72%, £23 10s.; 60%, £26 5s.; 98/99%, powdered, £29 to £30 per ton ex station. Fair inquiry for export.

SODIUM HYPOSULPHITE.—Moderate inquiry. Pea crystals, £21 per ton; commercial, £14 10s. per ton ex store.

SODIUM NITRATE.—£14 15s. per ton f.o.r. or f.o.b. Refined quality 5s. more.

SODIUM PRUSSIATE, YELLOW.—Price firm at 10½d. to 10¾d. per lb.

SODIUM SULPHATE (SALTCAKE 95%).—Good inquiry for export, £4 per ton f.o.b. U.K.

SODIUM SULPHITE (CRYSTALS).—Moderate inquiry, £14 10s. to £15 ex station.

SULPHUR.—Surplus Government stocks of Sicilian Thirds, £4 5s. to £4 15s. per ton; flowers, £14; ground, £13; rock, £12; roll, £13; moderate inquiry for roll and rock.

ZINC OXIDE.—Continental offers of £35 c.i.f.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHANAPHTHYLAMINE.—Small inquiry. Price quoted for small lots, 2s. 1d. per lb., kegs free, carriage paid.

BENZALDEHYDE (CHLORINE FREE).—Continental manufacture offering at 1s. 9d. per lb. c.i.f.

"H" ACID.—Home inquiries. Price lower, at 6s. 9d. per lb. on 100% basis, carriage paid.

NITRONAPHTHALENE, REFINED.—Offered at 1s. per lb. carriage paid.

ORTHO CRESOTINIC ACID.—Offered at 2s. per lb. ex works.

PARA AMIDO ACETANILIDE.—Offered at 6s. 9d. per lb. delivered, casks free.

PARANITRANILINE.—Prices inclined to be cheaper, at 3s. 4d. to 3s. 5d. per lb. delivered.

PARANITRO ACETANILIDE.—Offered at 4s. 6d. per lb. carriage paid, casks free.

PHTHALIC ANHYDRIDE.—Inquiries for home trade. Price quoted, 2s. 6d. per lb. carriage paid.

Government Contracts

THE following were among the Government contracts let during the month of April:—

ADMIRALTY (CONTRACT AND PURCHASE DEPARTMENT).—*Calcium Chloride:* Hopkin and Williams, Ltd., London. *Chemicals:* F. Allen and Co., Ltd., London; United Alkali Co., Ltd., Runcorn. *Oxide of Iron Paint:* Hemingway and Co., Ltd., London. *Oxide of Zinc Paint, White:* Indestructible Paint Co., Ltd., London. *White Lead Paint:* Brimsdown Lead Co., Ltd., Brimsdown. *Soft Soap Substitute:* Ferguson, Shaw and Sons, Glasgow; Palmer and Co., Ltd., London.

AIR MINISTRY.—*Fuel Oil:* Anglo-American Oil Co., Ltd., London.

POST OFFICE.—*Chloride of Ammonia (Voltoids):* Brunner, Mond and Co., Ltd., Winnington, Cheshire.

Low Temperature Research

A LOW temperature research station, claimed to be the first of its kind in the world, has just been completed at Cambridge, and members of the Cold Storage and Ice Association were entertained at luncheon last week during a visit arranged by the Director of the Food Investigation Board. The station will be chiefly concerned with experiments on food refrigeration, but a special section will be devoted to study of the effects of low temperatures on plant life.

German Chemical Trade Notes

FROM OUR OWN CORRESPONDENT.

Berlin, June 5, 1922.

HEAVY fluctuations in foreign currencies have hampered trade during the past week. This uncertainty will probably be further accentuated by a further increase of 20 per cent. in freight rates and another rise in coal prices, both of which are now in force.

Makers' prices to-day are in many cases higher than the retail prices ruling some weeks ago, and buying is only of the hand-to-mouth variety.

There is also a slackening off in export trade which is attributed partly to the unusually large supplies of German goods at present in Sweden, Holland and other Continental countries. Exports of dyestuffs and pharmaceuticals have shown a slight, but, it is thought, only temporary improvement.

Business on the Austrian chemical market is moving within restricted limits, and buyers are not inclined to commit themselves to any great extent. The products which are receiving most attention are copper sulphate, potassium prussiate, citric acid, boric acid, acetic acid, saltcake, glycerine and caustic soda.

The following quotations are given in marks per kilogram (d.=domestic price; e.=export price).

ACIDS: Acetic, 80%, very scarce at 55 mk. d.; no export offers. Benzoic, 175 mk. d.; 200 mk. e. Boric, crystallised, 84 mk. d.; powdered, 85/90.25 mk. e. Citric, in strong demand, with firm tendency at 320 mk. d.; 315 mk. e. Formic, technically pure, 85%, 27 mk. d.; 50%, 22.50 mk. d. Phthalic, 98/100%, 42 mk. d.; 72 mk. e. Salicylic, 165 mk. d.; 200 mk. e. Sulphuric, 10/13 mk. e. Tartaric, in fair request at 170 mk. d.; 195 mk. e.

INDUSTRIAL CHEMICALS: Alum, Potash, in lumps, 12 mk. d.; 15 mk. e.; Potash, crystal powder, 9.50 mk. d.; 12.50 mk. e.; chrome, 15%, 36 mk. d.; 40 mk. e. Alumina Sulphate, 14/15%, 7.25 mk. d.; 9 mk. e.; 17/18%, scarce, at 11 mk. e. Ammonia Carbonate, A1 powdered, 19/21.50 mk. d.; 30/32 mk. e.; in lump, 30 mk. d.; 42 mk. e. Barium Chloride, 25 mk. d. Betanaphthol, 66.50/68.50 mk. d.; 77/82 mk. e. Bleaching Powder, 35/37%, in strong demand at 7.25/8 mk. d. Borax for home use could be had at 40/42 mk.; export price, 39/44 mk. Calcium Chloride, 70/75%, in good demand from abroad at 6 mk.; 90/95%, scarce at 9 mk. e. Cobalt Oxide, R.K.O., 1,150 mk. d. Copper Sulphate meeting with steadily maintained demand; large crystals, 98/100%, stood at 54.50 mk. d. ex Mannheim; Hamburg reported 98/100% 38 mk. d.; 40 mk. e. Cream of Tartar, 99/100%, 130/135 mk. d.; 160 mk. e. Dextrine, yellow, in good demand at 35 mk. d. Glauber's Salt, crystallised, commercial quality, loose, offered at 2.30/2.75 mk. d.; 3.50 mk. e. Glycerine, 28° chem. pure, 100 mk. d.; 110 mk. e. Lead, red, 38 mk. d.; 42 mk. e. Lead, white, powdered, 40 mk. d.; 44 mk. e. Sugar of Lead, 43 mk. d.; 48 mk. e. Litharge, in strong demand for export at 46/48 mk. Lithopone, Red-Seal, 17/18.25 mk. d.; 22/28 mk. e. Potassium Bichromate, 68 mk. d.; 80 mk. e. Potash Caustic, moving around 26/28 mk. d.; liquor, 12.50 mk. d. Potassium Carbonate, 96/98%, 28.25/30 mk. d.; 36/38 mk. e. Potassium Chlorate, 25/30 mk. d.; 33/38 mk. e. Potassium Metabisulphite, 50/52 mk. d.; 60/65 mk. e. Potassium Permanganate, a little business at 70 mk. d. and 80 mk. e. Potassium Prussiate, yellow, 168/180 mk. d.; red, in good demand, from the U.S.A. at 420 mk. Potash Saltpetre is unchanged at 29 mk. Salt Cake was sold at 4.85/5.35 mk. d.; 6.25 mk. e. Soda, crystallised, 7.60 mk. d. Soda Ash, .96/98%, 15.50/16 mk. d. Sodium Benzoate in fair request at 180 mk. e. Sodium Bicarbonate, 8.50 mk. d. 18.50 mk. e. Sodium Bichromate, 58/60 mk. d.; 70 mk. e. Soda Caustic, 125-128°, 30.75/31 mk. d.; 32 mk. e.; liquor in strong demand at 13/14 mk. d. Sodium Hyposulphite, 12.50 mk. d.; 17.50 mk. e. Soda Saltpetre, technical, is unchanged at 21.50 mk. d. Sodium Silicate, 38/40° Bé., 6.50 mk. e. Sodium Sulphide crystallised, 30/32%, 10/10.50 mk. d.; 12.50/13.50 mk. e.; concentrated, 60/62%, 21/21.50 mk. d.; 26 mk. e. Zinc, white, red-seal, 37/39 mk. d.; 46/48 mk. e.

Brass Casting Research

THE British Non-Ferrous Metals Research Association has recently carried out an extensive research on the influence of gases on high grade brass. At the Research Laboratory, Woolwich, a further investigation is now being made by the Association with the co-operation of the Engineering Co-ordinating Board of the Department of Scientific and Industrial Research. The chief object of the present work is to study the conditions necessary for securing both surface and internal soundness of strip brass ingots such as are required for cold rolled sheet metal.

Manchester Chemical Market

Monthly Report by Sir S. W. Royse & Co., Ltd.

A RATHER better tone has been evident during the month of May, but business is still hindered by labour troubles and has continued more or less spasmodic. The reductions in railway rates which came into force last week affect chemicals only slightly, and it is to be hoped that concessions of a more general nature may soon be made.

Sulphate of copper has remained steady in price, although the metal has advanced; exports of this article continue to show rather better figures for this year as against 1921. Green copperas is available at easy rates and is going only slowly into consumption. The supply of acetate of lime has been somewhat improved by arrivals from abroad, but the demand is not active. Acetic acid is a shade lower in value. Acetate of soda has been in good request, and is wanted, the small importations having been readily absorbed.

Lead products are not affected by the firmer tone in the metal. Lead acetates are in small demand; foreign white acetate is offering at a good reduction. Nitrate of lead is steady and only sparingly called for. Carbonate and caustic potash have been in moderate demand and prices are practically unchanged. Montreal potashes are a quiet and easy market. Yellow prussiate of potash is slightly dearer, but soda is strong and has advanced owing to short supply, together with good export sales and further inquiries. White powdered arsenic is scarcer on the spot, but demand continues to be limited to small lots. Tartaric acid is firmer and is moving more freely; continental makers are now naming increased figures, being well engaged and unable to offer except for forward positions. Cream of tartar has a good sale at recent rates. Citric acid is in good request, but short in supply for near delivery.

Bichromates of potash and soda remain without change. Chlorates of potash and soda are little called for, and the former is pressed for sale. Borax and boracic acid are steady and move slowly. Phosphate of soda is unchanged. The foreign competition is strong in alum and sulphate of alumina. The inquiry for muriate of ammonia and salammoniac is rather better. Bleaching powder has been in fair request, especially for the home trade. White caustic soda and ammonia alkali have been well inquired for.

There is no material change in the tar products market. Benzols and toluols are steady and the former has more demand as motor fuel. The inquiry for solvent naphtha is small and very erratic, and consequently prices are easier. Creosote is somewhat firmer owing to increasing exports. The demand for dehydrated tar has been disappointing to makers who have provided large stocks, and values are lower. Crude carbolic acid shows an improvement, but production continues very small. Naphthalenes, if anything, are easier, the consumption of the firelighter trade having fallen off considerably. In pitch there has been more inquiry for spot shipment, but the demand has now been covered.

The hot weather is seriously interfering with shipments. In South Wales a little business has passed for prompt delivery, but consumers are unwilling to pay present prices for forward. The patent fuel market is also showing signs of easing off after the recent demand. There is no change in sulphate of ammonia, the season being practically over. Production has been down, and consequently supplies have been readily taken up.

Farina and dextrine remain firm and are sparingly offered from stock. Barytes is selling quietly at slightly easier prices; the improvement in transport of continental supplies has not been maintained, and delays are again frequent. Paraffin wax and scale have continued quiet. In China clay there is an improved demand for export, and the reduction in railway rates should stimulate business in the home trade. Turpentine has fluctuated rather widely during the current month, but trade has been confined to small dimensions.

Industrial Chemistry in China

IN view of the increasing importance of the chemical industry in China and the lack of organisation to promote interest in it, Chinese and foreign chemists in Peking have formed an association to be known as "The Chung Hwa Chemical Industrial Association." The inaugural meeting was held at the Chinese Returned Students' Club, Nanhoyun, Peking, on April 23.

Company News

CHLORIDE ELECTRICAL STORAGE CO.—The report for the year to March 31 last shows a profit, after providing for depreciation and taxation, of £73,968, and £23,340 was brought in. After paying preference dividend, the directors recommend a further dividend of 5 per cent., free of tax, on the ordinary, making 10 per cent. for the year, free of tax; £20,000 to employees benefit fund; £20,000 to reserve (making it £60,000); and carrying forward £31,613. The annual meeting will be held at the company's office, Clifton Junction, near Manchester, on June 16, at 11 a.m.

FORTH GLASS WORKS.—The report for the year to March 31 last shows a loss, after deductions for depreciation, of £5,841. After deducting £1,022 brought in, there remains a net debit balance of £4,819. The annual meeting will be held in Glasgow on June 12, at noon.

BRUNNER, MOND AND CO., LTD.—The report for the year to March 31 last states that the profit and loss account shows a balance to credit of £1,022,000, which, with the amount of £138,308 brought in, makes a total of £1,160,308. An amount equivalent to the depreciation of stocks and the cost of issue of preference shares has been transferred from investment surplus reserve account to the credit of profit and loss account to meet these charges, which are debited thereto. Investment surplus reserve account has been closed by the creation of a capital reserve account of £1,000,000 and the transfer of £220,101 to general reserve, in addition to the transfer to profit and loss account. The directors propose to deal with the balance of profit as follows: Interim half-yearly dividend on the preference capital at 7½ per cent. per annum, paid December 20, 1921, less tax, £95,312; dividend now to be paid on the preference capital at 7½ per cent. per annum, less tax, £150,000; interim half-yearly dividend on ordinary capital at 5 per cent. per annum, paid December 20, 1921, less tax, £240,242; dividend now to be paid on the ordinary capital at 11 per cent. per annum, making 8 per cent. for the year, less tax, £530,664; to suspense account, £50,000; written off patents account, £797; carried forward, £93,293. It is proposed to post the dividend warrants on June 27. The annual general meeting will be held at the Exchange Station Hotel, Tithebarn Street, Liverpool, On June 16, at 1.

A. BOAKE ROBERTS AND CO.—The directors announce a dividend of ½ per cent. on the ordinary shares, making 6 per cent. for the year; £3,000 is placed to reserve, and £1,744 for employees' commission and profit-sharing. The amount carried forward is £6,889.

ZINC CORPORATION.—The report for 1921 states that during the year there was no important change in the labour situation. The mine has not been worked, and productive operations were restricted to the zinc treatment department. The profits for the year were £121,502, to which is added appropriations for mine development, etc., unexpended, of £22,576, making £144,078. After providing for preferential dividends and other expenses, £42,548 remains, from which has to be deducted the sum of £24,569, being dividend payable on June 30, leaving £17,979 to be carried forward. The annual meeting will be held at River Plate House, Finsbury Circus, London, on June 14, at noon.

NOBEL INDUSTRIES, LTD.—The directors have now received sufficient particulars of the results of the constituent and associated companies for the year 1921 to enable them to declare a dividend on the ordinary shares (payable July 1) on account of that year of 5 per cent., less tax at 6s. in the £. After this distribution (which they propose in due course to recommend as final for 1921) the estimates show that there will be a balance on profit and loss account for the year to add to the amount carried forward (£757,498) as at December, 31, 1920. The recommendations to be made to the shareholders for the appropriation of this carry-forward will include the allocation of a substantial proportion thereof to a special investment reserve account. The final completion of the constituent companies' accounts, with their outstanding taxation settlements, will make it necessary to defer the annual general meeting until early September.

ALIANZA CO.—A final dividend of 25 per cent. for the year 1921, making 40 per cent. for the year, having been declared by the company in general meeting held in Valparaiso on June 6, warrants in respect thereof (less income tax) were posted on Thursday to registered shareholders in the United Kingdom. Coupons payable at the London office will be subject to deduction of British income tax at the rate of 6s. in the £, and must be left three clear days for examination. They may be lodged any day (Saturdays excepted) between the hours of 11 a.m. and 3 p.m.

A Calcium Carbide Contract

IN the King's Bench Division, on May 25, Mr. Justice Darling had before him a petition of right by the British Carbide Factories, Ltd., Bank Street, Clayton, Manchester, against the Crown, arising out of a contract for the manufacture by the suppliants of munitions for the Government during the war. Mr. Compton, K.C., for the suppliants, said the claim was for money alleged to be due from the Crown in the circumstances that the Crown had not performed their contract. The contract was for the supply of a minimum quantity of 5,000 tons of carbide, and it was determined by the Crown when only 3,000 tons had been supplied. The suppliants claimed partly for money which would have been due under the contract if it had been carried out to its end and partly for damages which they had suffered by reason of the premature determination of the contract. There was a counter-claim for a sum due to the Crown in the trading, which had been agreed. The agreement was that the loan should be repaid by a deduction of £1 on every ton of carbide supplied. The suppliants contended that was to be the only payment, and if the contract came to an end before the whole £10,000 was paid the Crown was not entitled to payment of the balance because the expenditure had been incurred for the benefit of the Crown as much as for the benefit of the suppliants. The Crown's contention was that the whole balance of the advance with interest was due to them. After legal argument for the Crown, the matter was adjourned to enable counsel to speak to the Attorney-General with a view to an arrangement being come to.

A Handy Wall Calendar

IN accordance with their usual practice, Cochran and Co., Annan, Ltd., boilermakers, of Annan, Scotland, have just issued their new wall tear-off calendar for the period June, 1922, to May, 1923. Two months are given on each sheet, the centre being occupied by an illustration of a Cochran boiler with an apposite drawing and description. The back sheet of the calendar gives the whole year in smaller divisions, thus facilitating reference to every month without the necessity of turning over the various sheets.

Tariff Changes

NEW ZEALAND.—All manures imported into New Zealand are now free of Customs duty.

NETHERLANDS EAST INDIES.—Revised rates of import duty are now in force for chloral hydrate, sulphuric ether, chloroform, acetic ether, collodion and other products derived from the distillation of alcohol.

ROUMANIA.—Increased import duties have been imposed on, *inter alia*, caustic soda, sulphate of ammonia, double sulphate of aluminium and potash, alum, chloride and hypochlorite of calcium, chloride of lime, silicate of soda, crystallised carbonate of soda, calcined carbonate of soda, calcium phosphate, sodium sulphide and sodium borate.

SPAIN.—As from June 1 all goods imported into Spain from countries whose exchange is depreciated more than 70 per cent. will have to pay an increase of Customs duty. In practice this new regulation amounts to nearly 100 per cent. increase for all goods coming from Germany, Austria, Portugal, Poland, etc. Italy, and also France, when her present tariff war with Spain ceases, will not fall under the Decree unless the franc and the lire depreciate still further. This measure has become necessary to protect Spanish producers against the excessive dumping that is at present going on. It does not affect British goods directly in any way, although indirectly it places them on a more equal footing with foreign competitors.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

ASBURY, Thomas, 56, Baggeholme Road, Lincoln, chemist, £24 17s. 8d. March 14.

BABER, T., 518A, London Road, Sheffield, chemist, £18 10s. 4d. April 6.

CURTIS, Frederick Fernandez, 20, Bury Street, Bloomsbury, London, chemists' sundriesman, £10 14s. 11d. March 30.

EDWARDS, J. M., 311, Fulham Palace Road, London, chemist, £18 17s. 4d. April 4.

PETERKIN (sued as a firm), 279, Garratt Lane, Wandsworth, chemists, £18 11s. 3d. March 31.

Receiverships

KENYON (S.), LTD. E. G. Clegg, of 3, York Street, Manchester, was appointed receiver and manager pursuant to Order of Court dated May 10, 1922.

WHEEN (J. B.) AND SONS, LTD. H. Cawood, of 68, Eyre Street, Sheffield, was appointed receiver on May 25, 1922, under powers contained in debentures dated May 19, 1917, and August 15, 1919.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

BARRON (THOMAS), LTD., Mexborough, glass bottle, etc., manufacturers. Registered May 27, £10,000 debentures; general charge. *£1,000. July 25, 1921.

BUDDEN AND CO., LTD., Liverpool, chemists. Registered May 24, £600 mortgage. *Nil. March 29, 1922.

HOVEY AND LOWTHER, LTD., Wheelock, manufacturers of phosphoric acid powder. Registered May 24, mortgage to bank. *Nil. April 7, 1921.

NATIONAL METAL AND CHEMICAL BANK, LTD., London, E.C. Registered February 14, agreement of compromise, to Lloyds Bank, Ltd., securing all moneys now due from the company to the bank; charged on the sum of £775,000, being the amount of money agreed to be paid by the Latvian Government to the Metal Bank in full satisfaction of all claims between the Metal Bank and the Latvian Government. *Nil. January 12, 1922.

STEEL (J. M.) AND CO., LTD., London, E.C., chemical merchants. Registered May 24, £1,000 debentures, present issue £400; general charge.

STELLA GILL COKE AND BYE-PRODUCTS CO., LTD., London, E.C.—Registered May 26, £1,000, £600 and £20,000 debentures, part of £300,000; general charge. *£83,000. June 24, 1921.

London Gazette

Reduction of Capital

BRITISH CELLULOSE AND CHEMICAL MANUFACTURING CO., LTD. (and reduced). A petition has been presented to the Court for confirming the proposed reduction of capital from £7,750,000 to £6,000,000, and is to be heard before Mr. Justice Astbury on Tuesday, June 20. Linklaters and Paines, 2, Bond Court, Walbrook, London, E.C.4, solicitors for the company.

Winding Up Petition

INESON GIBBS OIL AND CHEMICAL CO., LTD. A petition for winding-up has been presented and is to be heard at the Court House, Corporation Street, Birmingham, June 15, at 10.30 a.m.

Company Winding Up

TURNERS GLASSWORKS CO., LTD. Registered office, Worksop, Nottingham. First meetings, June 13, The Law Society's Rooms, Hoole's Chambers, Bank Street, Sheffield. Creditors 12 noon, and contributories 12.30 p.m.

Bankruptcy Information

F. FORD AND CO., Bush Lane House, Cannon Street, London chemical, oil and colour merchants. Receiving order, May 30. Creditor's petition. First meeting, June 13, 1 p.m., and public examination, August 8, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

SOUTHERST, John, carrying on business as THE FARNWORTH MACHINE GLASS CO., Farnworth, co. Lancaster, also as SOUTHERSTS at Thornton Street, Collyhurst, Manchester, glass bottle manufacturer. First meeting, June 13, 2.30 p.m., Official Receiver's Offices, Byrom Street, Manchester. Public examination, June 23, 10 a.m., Court House, Quay Street, Manchester.

New Companies Registered

V. M. GLYNN, LTD. Wholesale and retail dealers in perfumery, soap, etc. Nominal capital, £19,000 in £1 shares (7,500 6 per cent. cumulative preference, 7,500 ordinary, and 4,000 founder's). A director: P. Ellison, 7, Lymington Road, London, N.W.6.

TALC, LTD. Dealers in talc, French chalk, soapstone, greenstone and other minerals. Nominal capital, £15,000 in 10,000 preferred shares of £1 each, and 100,000 deferred shares of 1s. each. A subscriber: J. B. Sagar, 96, Natal Road, New Southgate, London.

SOUTHPORT FIREWORKS, LTD. Manufacturers of sporting or military explosives, gunpowder, nitroglycerine, dynamite, guncotton, blasting powder, etc. Nominal capital, £5,000 in £1 shares. A director: F. Battersby, 14, Clarendon Place, Hyde.

CHARLES HUNTER AND CO., LTD., 39, Wellington Road, Liverpool. To acquire processes for the manufacture of furniture, boot and floor polishes, cleansing fluids and solutions. Nominal capital, £1,000 in £1 shares.

COOPER AND CALVERT, LTD., Old Bank Chambers, Otley, Yorks. Dealers in patent medicines, manures, fertilisers, etc. Nominal capital, £1,000 in £1 shares.

BROWN BROTHERS (SOUTH SHIELDS), LTD. Analytical, manufacturing, consulting and pharmaceutical chemists, etc. Nominal capital, £2,000 in £1 shares. A director: F. A. Brown, Glenhurst, Harton, South Shields.

GEORGE SIMON, LTD., 64, Great Portland Street, London. Dealers in chemicals, oils, etc. Nominal capital, £500 in £1 shares.

PIONEER BY-PRODUCTS SYNDICATE, LTD. Importers and exporters of and dealers in oil, grease, petrol, benzol, chemicals, etc. Nominal capital, £20,750 in 20,000 preference shares of £1 each, and 15,000 deferred shares of 1s. each. A subscriber: S. Van den Bergh, 114, Park Street, London.